



भारत सरकार
Government of India

भौगोलिक उपदर्शन पत्रिका

GEOGRAPHICAL INDICATIONS JOURNAL



बौद्धिक सम्पदा
भारत
**INTELLECTUAL
PROPERTY INDIA**

भौगोलिक उपदर्शन पंजीकृति,
बौद्धिक सम्पदा अधिकार भवन,
जी.एस.टी. रोड, गिन्डी,
चेन्नै - ६०० ०३२.

**Geographical Indications Registry,
Intellectual Property Rights Building,
G.S.T. Road, Guindy, Chennai - 600 032.**



**GOVERNMENT OF INDIA
GEOGRAPHICAL INDICATIONS
JOURNAL NO. 200**

NOVEMBER 30, 2024 / AGRAHAYANA 09, SAKA 1946

INDEX

S. No.	Particulars	Page No.
1	Official Notices	4
2	New G.I Application Details	5
3	Public Notice	6
4	GI Applications	
	Aceto Balsamico di Modena - GI Application No.348	7
	Thovalai Maanika Maalai - GI Application No.816	14
	Kumbakonam Vetrilai (Kumbakonam Betel Leaf) - GI Application No.817	25
	Panruti Palappazham (Panruti Jack Fruit) - GI Application No.836	39
	Panruti Cashew - GI Application No.837	51
	Puliyankudi Acid Lime - GI Application No.881	65
	Virudhunagar Samba Vathal - GI Application No.883	76
	Chettikulam Small Onion - GI Application No.920	87
	Kannadippaya (Bamboo Mat) - GI Application No.927	99
	Radhunipagal Rice - GI Application No.1042	114
	Ramanadu Chithiraikar Rice- GI Application No.1051	138
6	General Information	151
7	Registration Process	153

OFFICIAL NOTICES

Sub: Notice is given under Rule 41(1) of Geographical Indications of Goods (Registration & Protection) Rules, 2002.

As per the requirement of Rule 41(1) it is informed that the issue of Journal 200 of the Geographical Indications Journal dated 30th November, 2024 / Agrahayana 09, Saka 1946 has been made available to the public from 30th November, 2024.

NEW G.I APPLICATION DETAILS

App.No	Geographical Indications	Class	Goods
1381	Wada Kolam Paddy Rice	31	Agricultural
1382	Nrusinhawadi Basundi	29	Food Stuffs
1383	Ragi of South Chotanagpur	31	Agricultural
1384	Rugda of Jharkhand	31	Agricultural
1385	Ladakh Nambu/Snambu Textile	24	Textiles
1386	Ladakh Pashmina Textile	24	Textiles
1387	Hoshiarpur Wood Inlay Craft	20	Handicraft

PUBLIC NOTICE

No.GIR/CG/JNL/2010

Dated 26th February, 2010

WHEREAS Rule 38(2) of Geographical Indications of Goods (Registration and Protection) Rules, 2002 provides as follows:

“The Registrar may after notification in the Journal put the published Geographical Indications Journal on the internet, website or any other electronic media.”

Now therefore, with effect from 1st April, 2010, The Geographical Indications Journal will be Published and hosted in the IPO official website www.ipindia.nic.in free of charge. Accordingly, sale of Hard Copy and CD-ROM of GI Journal will be discontinued with effect from 1st April, 2010.

Registrar of Geographical Indications

G.I. APPLICATION NUMBER – 348

Application Date: 28-11-2011

Application is made by Consorzio Aceto Balsamico di Modena at C/o C.C.I.A.A. Via Ganaceto, 134 - 41100 Modena, Italy for Registration in Part A of the Register of **Aceto Balsamico di Modena** under Application No. 348 in respect of Vinegar falling in Class – 30 is hereby advertised as accepted under Sub-section (1) of Section 13 of Geographical Indications of Goods (Registration and Protection) Act, 1999.

- A) Name of the Applicant :** Consorzio Aceto Balsamico di Modena
- B) Address :** Consorzio Aceto Balsamico di Modena,
C/o C.C.I.A.A. Via Ganaceto, 134 - 41100
Modena, Italy

Address of Service in India:
"K & S PARTNERS
515-B, Platinum Tower,
5th Floor Sohna Road, Sector 47,
Gurgaon - 122 022
National Capital Region, India".

- C) Name of the Geographical Indication :**
Aceto Balsamico di Modena

- D) Types of Goods :** **Class 30 – Vinegar**

E) Specification:

Aceto Balsamico di Modena (Balsamic Vinegar of Modena) is a deep brown vinegar originating from the Modena and Reggio Emilia provinces of Italy. Aceto Balsamico Vinegar of Modena has physical, chemical and organoleptic characteristics that are uniquely correlated; it also has a higher content of extractive substances and volatile compounds.

Aceto Balsamico di Modena is reserved for vinegars that present the following characteristics:

- clear and bright appearance;
- deep brown color;
- sweet and sour and balanced flavour;
- slightly acetic and delicate smell, long-lasting, with possible woody notes;
- density at 20°C not less than 1.06 for the refined product;
- actual alcohol content not exceeding 1.5% vol.;
- minimum total acidity 6%;
- total sulphur dioxide: maximum 100 mg/l;
- ash: minimum 2.5 per thousand;
- net dry extract: minimum 30 g/l;
- reducing sugars: minimum 110 g/l.

F) Description of Goods:

Aceto Balsamico di Modena (Balsamic Vinegar of Modena) is a deep brown vinegar originating from the Modena and Reggio Emilia provinces of Italy. It is produced from grape must to which

wine vinegar is added, employing a traditional method of production.

Analytical characteristics:

- density at 20 °C not less than 1.06 for the refined product,
- actual alcohol strength not more than 1.5 %,
- total acidity not less than 6 %,
- total sulphur dioxide: not more than 100 mg/l,
- ash: not less than 2.5 per thousand,
- minimum dry extract content: 30 g per litre,
- reducing sugars: not less than 110 g/l,

Organoleptic properties:

- clarity: clear and bright,
- colour: deep brown,
- aroma: persistent, delicate and slightly acidic with woody overtones,
- taste: bitter-sweet, balanced

G) Geographical area of Production and Map as shown in page no:

'Aceto Balsamico di Modena' must be produced within the provinces of Modena and Reggio Emilia in Italy. A duly certified copy of the map of the Emilia Romagna region of Italy, which shows the borders of the provinces of Modena and Reggio Emilia where the Aceto Balsamico di Modena is produced

The aforesaid production area lies within the geographical co-ordinates as provided below:

	Latitude	Longitude
North	44°59'31.3"N	10°43'38.6"E
East	44°21'14.7"N	10°08'35.4"E
South	44°06'58.2"N	10°48'53.2"E
West	44°50'21.3"N	11°22'04.6"E

H) Proof of Origin (Historical records):

The origins of Aceto Balsamico di Modena are seen in the ancient Roman times, when soldiers used to cook down grape juice (the must, or sapum at that time), obtaining a natural sweetener for their beverages. Left in the open air on a certain area around the Poriver, cooked must was noticed to turn into an acidic syrup, soon adopted as a cooking aid (Virgilio, Columella, 1st century).

Starting in the 11th century, the production of this very particular vinegar was linked with Modena. Over time, it would become synonymous of the culture and history of a territory that is unique for its pedoclimatic characteristics and its human knowledge and talent.

The first traces of this special production date back to the historian Donizone, an abbot and biographer of the Countess Matilde, who in the thirteenth chapter of his book, "Vita Mathildis" (kept in the Vatican Library) narrates how in the year 1046 Bonifacio, Marquis of Tuscany and father of Matilde, sent a small bottle of vinegar from Canossa to Enrico III of Germany. Actually, it was the future Emperor himself to ask for "some of that vinegar that you make so special" so revealing that vinegar making in that area was already important and well-known. A relevant excerpt from the book "Vita Mathildis"

Only later, several documents identified the House of Este's acetaia (vinegar cellar) in Modena as the first true origin of balsamic vinegar production since the 13th century.

Over centuries, the adjective balsamic was added to vinegar due to its presumed, particular healing performances. All that is confirmed by the "Registro delle Vendemmie e vendite dei vini, per conto delle due cantine segrete (Ducali) per l'anno 1747", ["Register of vintages and wine sales by the two (ducal) secret cellars in the year 1747"] containing the inventories of the House of Este and dated back to the middle of the 13th century. A relevant excerpt from the "Registro delle Vendemmie e vendite dei vini, per conto delle due cantine segrete (Ducali) per l'anno 1747"

From this common origin, generations after generations a few distinct production methods were developed and followed by families and local producers: alongside this excellent production, passed down from one generation to another like a precious gift, it became vital to produce a vinegar that would undergo a less expensive procedure and generate a larger quantity to be consumed daily and be suitable for cooking.

A few decades later - in 1800 - Balsamic Vinegar of Modena (Aceto Balsamico di Modena) began being appreciated and known abroad: it was presented in the most important exhibition events of the time, from Florence to Brussels. And it was again in the 19th century that the first dynasties of producers established themselves, some of whom today are among the associates of the Protection Consortium.

Between 1800 and 1900, the production procedures and the characteristics of the final product were progressively coded and it was exactly on March 25th, 1933 that the Minister of Agriculture, Giacomo Acerbo, officially recognized this "centuries-old and characteristic industry" that had already firmly established itself and had begun its journey as a main character in the history of Italian gastronomy. A copy of the official note from the Italian Ministry on the production of "Aceto Balsamico Modenese" dated March 25, 1933

The first production regulation for Aceto Balsamico di Modena, tying this specialty to its territory, dates back to 1965; in 2009, the final denomination "Aceto Balsamico di Modena" as a Protected Geographical Indication was acknowledged by the European Union.

Aceto Balsamico di Modena, as a product, is much sought after around the world including in India. The same is used for gourmet cooking by restaurants and in households equally. The export figures of Aceto Balsamico di Modena to various countries including India from 2014 till 2019

I) Method of Production:

'Aceto Balsamico di Modena' is obtained from grape must that is partially fermented and/or boiled and/or concentrated by adding a quantity of vinegar aged for at least 10 years and with the addition of at least 10% of vinegar produced from the acidification of wine only. The percentage of boiled and/or concentrated grape must should not be less than 20% of the volume sent for processing. The concentration increases until the initial amount of must attains a density of at least 1,240 at a temperature of 20 °C.

In order to ensure that 'Aceto Balsamico di Modena' acquires the properties described in point 4.2, the grape must has to be produced from the following vine varieties: Lambrusco, Sangiovese, Trebbiano, Albana, Ancellotta, Fortana and Montuni. It must have the following characteristics:

- minimum total acidity: 8 g/kg (only for boiled and concentrated must),
- minimum dry extract content: 55 g/kg (only for boiled and concentrated must).

A maximum of 2 % by volume of end product of caramel may be added for colour stability. No other substance may be added. Production of 'Aceto Balsamico di Modena' must follow the customary method of acidification using selected bacterial colonies or using the well-established method of slow surface acidification or slow acidification with wood chippings, followed by refining. In any case, acidification and refining take place in high-quality wood receptacles, such as oak, in particular sessile oak, chestnut, mulberry or juniper, for at least 60 days from the date at which the raw materials are assembled and ready for processing. The receptacles in which 'Aceto Balsamico di Modena' is released for direct consumption must be made of glass, wood, ceramic or terracotta with the following capacity: 0.250 l, 0.500 l, 0.750 l, 1 l, 2 l, 3 l or 5 l; or in single-dose sachets of a maximum capacity of 25 ml made of plastic or composite materials, bearing the same wording as that on the labels of the bottles. Receptacles made from glass, wood, ceramic or terracotta with a capacity of 5 litres or more, or plastic bottles with a capacity of 2 litres or more are allowed, however, if the product is intended for professional use. The assembly of raw materials, processing, refining and ageing in wood receptacles must take place in the geographical area of origin. The product may be packaged outside the provinces of Modena and Reggio Emilia.

LABELLING

The packaging must bear the name 'Aceto Balsamico di Modena' along with the wording 'Indicazione Geografica Protetta' (protected geographical indication) written in full or abbreviated, in Italian and/or in the language of the country of destination. The name 'Aceto Balsamico di Modena' may not be qualified in any way, even in numerical form, other than by those adjectives expressly provided for in this specification, including 'extra', 'fine', 'scelto', 'selezionato', 'riserva', 'superiore', 'classico' or similar. Only the word 'invecchiato' (aged) without any further additions may also appear, provided that the product is aged for a period of three years or more in casks, barrels or other wooden receptacles.

J) Uniqueness:

The Aceto Balsamico di Modena production area, according to tradition and in compliance with current regulations, corresponds to the provinces of Modena and Reggio Emilia. In this area there is an abundance of grapes with just the right concentration of sugars and acidity.

Modena and Reggio Emilia are located in the plains of Emilia Romagna, along the scenic landscape that follows the course of the River Po and crosses the Secchia and Panaro basins. This is the area of the old Este Duchy: a land rich in history and with a great culinary tradition. It was the farmers' ancient knowledge and the innate love for living well and eating well, together with the pedoclimatic characteristic of the territory, that gave life to a local and exclusive product such as Aceto Balsamico di Modena.

The Modena and Reggio Emilia areas have a typical semi-continental climate, tempered by the influence of the nearby Adriatic Sea. The winters are cold, with average temperatures around 2°C, the summers are hot and humid, with temperatures reaching as high as 35°C. Autumn and spring temperatures are very mild. These conditions favour the development of the native acetic flora, which determines the maturation and ageing process of Balsamic Vinegar of Modena (Aceto Balsamico di Modena). The Modena and Reggio Emilia areas are characterized by moderate rainfall (about 750 mm a year) and by fog, especially in late autumn and in winter.

'Aceto Balsamico di Modena' has for a long time represented the culture and history of Modena and its worldwide reputation is undeniable. The product is closely linked to the knowledge, traditions and skills of the local people, who have created an exclusive and distinctive local product. 'Aceto Balsamico di Modena' has become part of the social and economic fabric of the area and is the source of income for many operators and an integral part of the local culinary tradition, as an

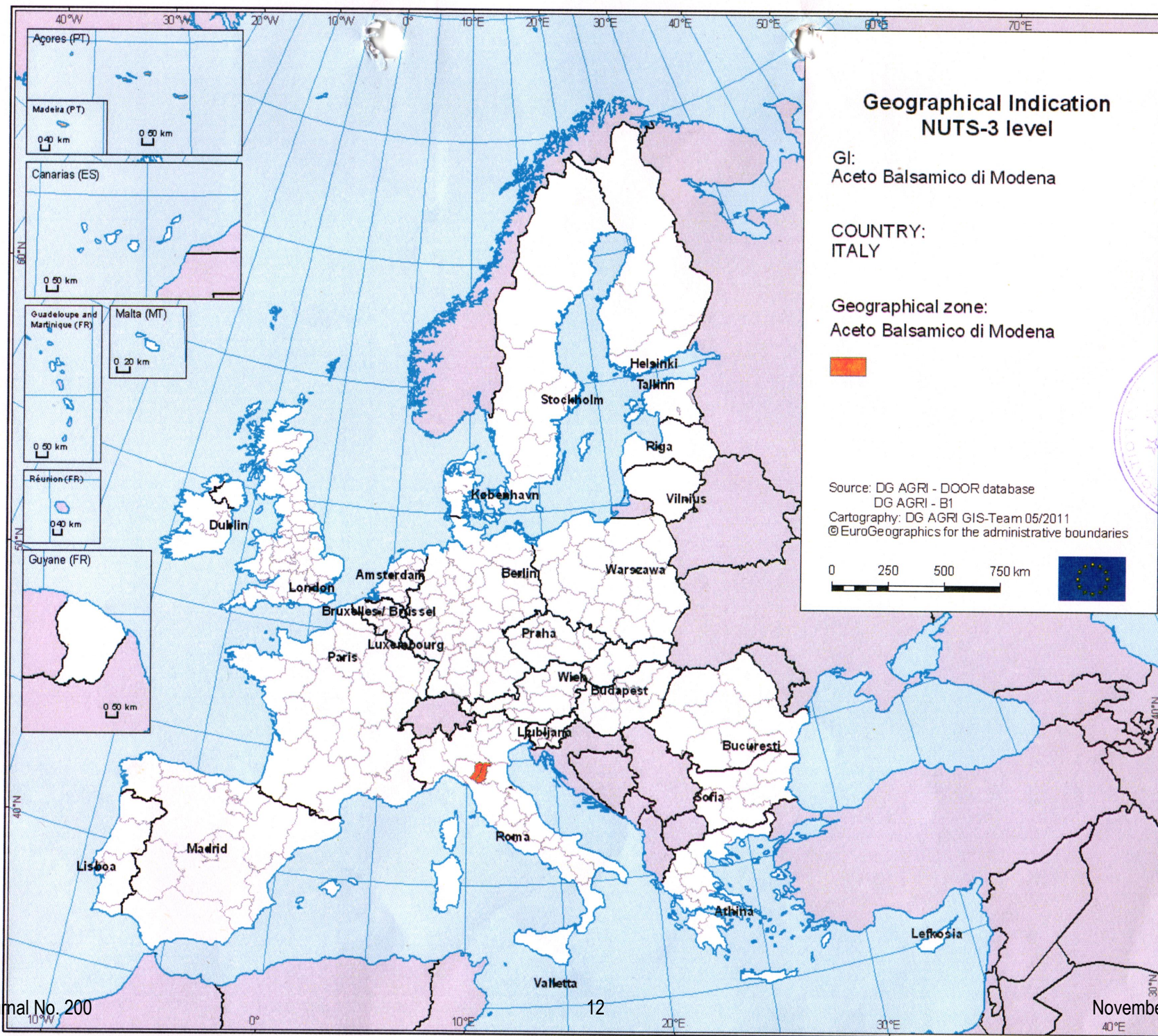
essential ingredient in many regional recipes. Dedicated festivals and events stemming from time-honoured traditions have taken place for many years, and are attended by local producers who meet and compare their produce, thereby perpetuating local customs. As a specific and special product, 'Aceto Balsamico di Modena' has built its reputation and appreciation over the years to achieve worldwide acclaim, and consumers mentally associate the product 'experience' with the image of quality cuisine in the two provinces of Emilia-Romagna.

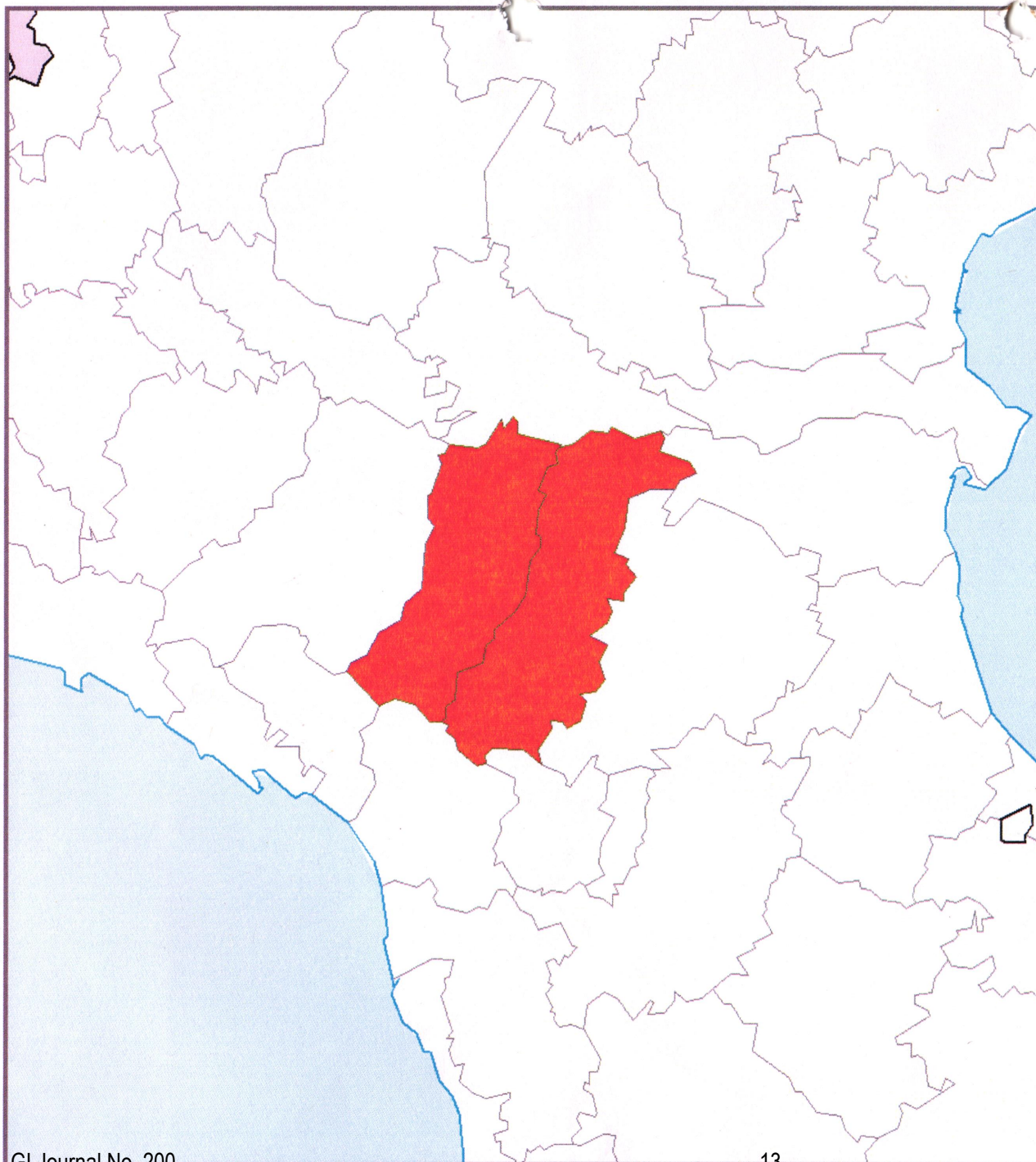
'Aceto Balsamico di Modena' has an excellent reputation on both the national and international markets, amply demonstrated by its frequent use in countless recipes and the many references to it on the Internet, in the press and in the other media. This reputation means consumers immediately recognize the uniqueness and authenticity of the product.

K) Inspection Body:

Each stage of the production process must be monitored by the inspection body in accordance with the monitoring programme, with all inputs and outputs recorded. This, along with the compilation of specific lists managed by the body that inspects the land registry parcels on which the vines are located, growers, must producers, processors and bottlers, as well as timely notification to the inspection body of the quantities produced, packaged and labelled, ensures product traceability. All natural and legal persons recorded in these lists may be subject to checks by the inspection body, as provided for in the production specification and the monitoring programme

L) Others:





Geographical Indication NUTS-3 level

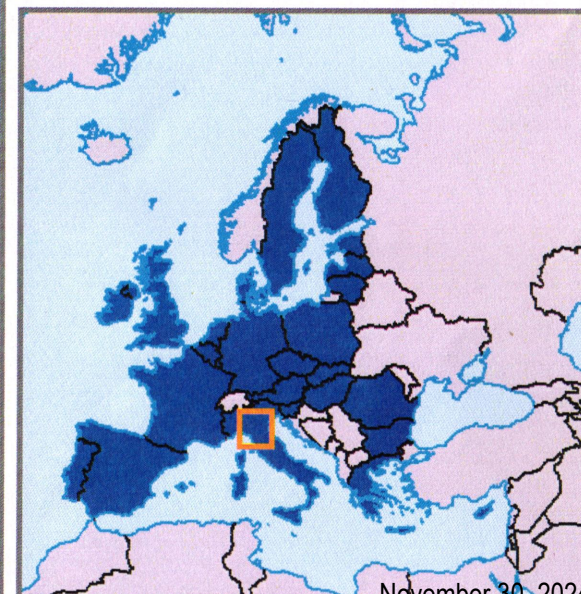
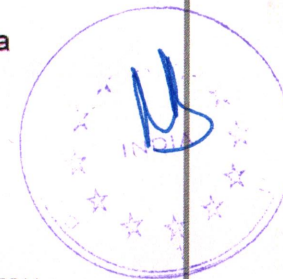
GI:
Aceto Balsamico di Modena

COUNTRY:
ITALY

Geographical zone:
Aceto Balsamico di Modena



Source: DG AGRI - DOOR database
DG AGRI - B1
Cartography: DG AGRI GIS-Team 05/2011
© EuroGeographics for the administrative boundaries



G.I. APPLICATION NUMBER – 816

Application Date: 13-01-2022

Application is made by Thovalai Maanikkamaalai Kaivinai Kalaingargal Nalasangam at 5/58, Indira Illam, Nool Nilayam Street, Thovalai and Anjal, District: Kanyakumari – 629 302, Tamil Nadu, India for Registration in Part - A of the Register of **Thovalai Maanika Maalai** under Application No. 816 in respect of Garland falling in Class – 31 is hereby advertised as accepted under Sub-section (1) of Section 13 of Geographical Indications of Goods (Registration and Protection) Act, 1999.

- A) **Name of the Applicant** : Thovalai Maanikkamaalai Kaivinai
Kalaingargal Nalasangam
- B) **Address** : Thovalai Maanikkamaalai Kaivinai
Kalaingargal Nalasangam,
5/58, Indira Illam, Nool Nilayam Street,
Thovalai and Anjal, District: Kanyakumari –
629 302, Tamil Nadu, India

Facilitated By:

1. Tamil Nadu handicrafts Development Corporation.
2. Intellectual Property Facilitation Centre – Chennai, MSME- Technology Development Centre, Chennai

- C) **Name of the Geographical Indication** :

THOVALAI MAANIKA MAALAI



- D) **Types of Goods** : **Class 31- Garland**

- E) **Specification:**

Thovalai Maanikka Maalai is a truly unique and treasured floral art that holds a special place in Indian culture, especially in the Tamil Nadu region. Known as the "garland of rubies," it stands apart from other traditional garlands because of its intricate and precise weaving technique, which creates the appearance of gems from flowers. Here's a deeper look at its significance, history, and the art behind this beautiful garland:

Garlands in Indian culture are not just ornamental but also deeply symbolic. They are used in a variety of contexts, such as:

- Religious rituals: Garlands are offered to deities, representing devotion and respect.
- Weddings and celebrations: They symbolize love, beauty, and the union of two souls.
- Symbolism of purity and peace: Garlands, often made of flowers, symbolize the purity of intentions and the natural beauty of life.

In the case of Thovalai Maanikka Maalai, the symbolism goes beyond its decorative value. The garland is known for its spiritual and aesthetic significance, representing a rare and precious offering, much like a ruby, which is considered a symbol of wealth, beauty, and purity.

The Unique Art of Thovalai Maanikka Maalai:

Name and Meaning: The name "Thovalai Maanikka Maalai" translates to "Garland of Rubies". This refers to the unique appearance of the garland, which, due to its flower folding technique, resembles a necklace of precious rubies or gems. The garland is made with multi-colored flowers, typically oleander, rose, and sometimes other local flowers.

Craftsmanship and Techniques: The process of creating a Thovalai Maanikka Maalai involves an aesthetic and geometric approach to flower arrangement. The flowers are carefully folded and arranged in precise patterns to create the appearance of gems (especially rubies) in a geometrically pleasing manner. This artistic skill requires great experience and expertise, which has been passed down through generations.

Distinctive Features:

- Multi-Colored Flowers: The garland is made using different colored flowers arranged in a way that each flower appears like a gemstone.
- Invisible String: The thread or string that holds the flowers together is almost invisible, making the flowers appear to float or be strung without any visible support.
- Geometric Proportions: The arrangement of flowers follows strict geometric proportions, which is essential to give the garland its distinctive look.
- Size and Design: The garlands can vary in size, ranging from 1 foot to 24 feet or more, depending on the occasion. The designs are often sketched beforehand, and the flowers are counted and arranged meticulously before they are knotted together. The flowers are typically arranged in five rows, though special occasions like weddings may call for twenty rows.

Material Selection: The flowers used for the garland are selected with great care. Oleander flowers (white and red) and roses (particularly red) are commonly used. These flowers are known for their ability to maintain their shape and color after being folded, making them ideal for creating the gem-like appearance.

Mat Shape: Unlike the typical tube-shaped garlands, the Thovalai Maanikka Maalai is often mat-shaped, giving it a more expansive, luxurious, and unique appearance.

The Role of Thovalai Village:

The people of Thovalai, a small village in Tamil Nadu, are the sole custodians of this ancient art form. For centuries, generations of artisans in this village have dedicated their lives to perfecting the craft of making Thovalai Maanikka Maalai. These artisans are so skilled that they can identify and distinguish garlands based on their quality and technique.

Long Tradition: The craft of making these garlands has been passed down from generation to generation, making it an ancient and heritage art. The knowledge of the technique is exclusive to the people of Thovalai.

Community Expertise: The local artisans begin their work by first sketching the design, and only after careful selection and quality examination of the flowers, the weaving begins. This process is done with immense precision and patience, and the garlands are considered masterpieces of floral art.

Religious and Cultural Role:

One of the most important uses of Thovalai Maanikka Maalai is in religious ceremonies. The Padmanabhapuram Temple and other temples in the region have long used these garlands in daily rituals. The garlands are considered an offering of the highest quality to the deities, symbolizing the purity, beauty, and devotion of the people.

Thovalai Maanikka Maalai is more than just a garland; it is a cultural masterpiece and a testament to the artistic ingenuity of the people of Thovalai. With its intricate design and gem-like appearance, this garland stands as a symbol of the beauty and devotion that Indian culture holds dear. The village's continued dedication to this ancient craft ensures that this remarkable floral art will endure for generations to come, preserving the rich cultural heritage of Tamil Nadu.

F) Description:

Thovalai Maanikka Maalai is a special type of garland that is made only in Thovalai. It comes in various shapes and sizes. It is different from other garlands because of the technique involved and its gem like appearance. The flowers in the garland are folded in a special way, giving the appearance of a gem.

A Maanikka Maalai can range from 1 foot to 24 feet and above. The flowers are generally arranged in five rows, though sometimes, for wedding decoration, twenty rows are used. The design is sketched on paper first, and then the flowers are counted and arranged precisely before knotting with the thread begins. The applicant members have been weaving garlands for the deity in the Padmanabhapuram temple every single day of their lives for many years.

The garland is made by hand with multiple varieties of flowers. It has white and red flowers from the flower of oleander and red flowers from the rose. These flowers turn into a pearl-studded gemstone garland. Further, the string of the garland is almost invisible in Thovalai Maanikka Maalai. And the final garland is mat shaped instead of the usual tube shape. Garlands of this sort are not made anywhere else.

People who have been producing this garland for a long time can tell apart garlands based on their qualities. The materials required are gathered from local markets and adjacent water bodies, and the process of weaving the flowers together begins only after a thorough quality examination. The flowers of a finely made Thovalai Maanikka Maalai are folded in a certain proportion to guarantee that all of the flowers have the appearance of a ruby. It is also necessary to ensure that the appropriate flowers and petals are used. The technique is known by only the people of Thovalai.

Thovalai Maanikka Maalai is of different types –

1. Temple Maanikkamaalai Haram
2. Temple Cart Maanikkamaalai

3. Marriage Maanikkamaalai
4. Maanikka Maalai Carpet
5. Bridal Maanikka Maalai Jadai
6. Stage Decorative Maanikkamaalai
7. Wall Hanging Maanikkamaalai
8. Maanikka Maalai jewels like Chain, Bracelets, Ear rings and mang tikka

Over the years, the artform of making Thovalai Maanikka Maalai has fascinated many including multiple VVIPs and dignitaries. When the Chinese President came to Mamallapuram, Prime Minister Narendra Modi described Thovalai Maanikka Maalai as one of the Tamil cultural arts. The garland was used for decoration during the wedding ceremony at the home of Indian billionaire Mukesh Ambani. For this, the women from Thovalai stayed in Mumbai for four days and decorated the large prayer room of Mukesh Ambani's house with garlands.

Depending on the size of the gemstone garland needed for the occasion, the time needed to make it is calculated, the cost of the coolies, and so on. To build large-scale garlands, it can even take up to 24 hours.

The makers of Thovalai Maanikka Maalai have been to Kolkata, Rajasthan, Kerala, Tirupati etc to showcase their talent. The applicant members go to venues, stay there for days and create this work of art. All of this marks the clear distinction that exists between Thovalai Maanikka Maalai and other normal garlands.

SPECIAL CHARACTERISTICS:

Thovalai Maanikka Maalai is different from other garlands because of the special technique involved in its making. This technique has been transferred from generation to generation for centuries. Currently being progressed by the fifth generation, the family makes the garland in a special way.

Making of a Thovalai Maanikka Maalai requires dedicated efforts and precision, as well as excellence that comes after years of training. For these reasons, it is harder to make than other garlands. Thovalai Maanikka Maalai gives the impression of a ruby and was thus, named so by the king of Travancore. It is made with flowers like oleander, rose, etc. The art of creating Thovalai Maanikka Maalai is recognized as a special craft in the state of Tamil Nadu. The final product as well as the time and effort taken to create a garland is unlike any other garland.

It is rightly known by its name "Maanikka Maalai" because of the ruby shaped flowers of the garland. the petals and flowers used in the garland are folded in such a way that they look like precious stones.

Further, the string of the garland is almost invisible and the final garland is mat-shaped instead of the usual tube shaped. Only very few kinds of flowers can be used when making Thovalai Maanikka Maalai. This is to ensure that the flowers don't break when folding. Similarly, Chamba fibre is considered ideal for the weaving of the flowers and petals.

To learn the skill of making Thovalai Maanikka Maalai, one needs to devote months and hard work and dedication. Only then, one can come close to being a perfectionist in the art.

QUALITY PARAMETERS:

To separate a well-made Thovalai Maanikka Maalai from a not so well-made one requires expertise in the art and skill. People who have been making this garland for years can tell if proper precision and accuracy was employed in the creation of the garland. In a good Thovalai Maanikka Maalai, the flowers are folded in a decided proportion to ensure that all flowers give the impression of a ruby. Further, it needs to be made sure that the right kind of flowers and petals are chosen. The materials needed are sourced from local markets and

nearby water bodies and only after proper quality inspection, the process of weaving the flowers together is started.

G) Geographical area of Production and Map as shown in page no:

Thovalai Maanikka Maalai is produced in the village of **Thovalai** village located in **Kanyakumari district of Tamil Nadu**. The village of Thovalai is famous for its abundance of flowers. Thovalai is a quintessential flower town, where several acres of gardens produce fresh flowers that are even exported. People here sell flowers and create other art pieces with them for a living. Flowers are an integral part of everyone's life. The flower industry has flourished here for generations. For many of them, it is their main occupation.

H) Proof of Origin (Historical records):

History of Thovalai Maanikka Maalai:

The gemstone garland:

The Travancore kings were fond of gemstones and jewelry studded with stones. Once Chithra Thirunaal Maharaja was gifted a flower garland made by a woman in Thovalai village. It was unique for its folding and knitting technique. The king appreciated the skill and gave a remark that the flowers in garland resemble gemstones, especially ruby. The name quickly gained popularity and the garland is known till date as "Maanikka Maalai", the gemstones garland. For over five generations, a family in this village has woven a unique type of garland called "Maanikka Maalai"

Invention of the Maanika Maalai:

Shri. Palani Pandaram invented the technique of Maanikka Maalai. He worked at the Kanji Parai and also made flower decoration garlands in Thovalai Village in Kanyakumari District, Tamilnadu. He was once making a coconut basket using dried coconut leaves with his colleague. It struck him that this method can be tried using natural flowers. So, he tried it with some flowers like jasmine, Pichi, Kaakadai, Kanagamparam, Kenthi, Sampangi etc. But that flowers were not suitable to fold using the technique. At last, he chose Oleander flower because it was suitable to fold. Thus, he found that oleander is the best flower for the garland making for this folding technique. Also, he chose natural chamba fiber for tying the flowers because his area was surrounded by a lot of ponds and since chamba grass grows in ponds, it was readily available to him. He tried by folding flowers (oleander) and natural fibers (Chamba fiber) into a single Row (Pagalam). He kept trying to weave a greater number of Rows. After that he decided to make a garland. He finished it by joining all the rows using some stick material. He initially chose bamboo stick, but eventually decided to use coconut stick for joining the rows. Finally, he made a mat-shaped Garland. The colour of that Garland was white as the Oleander flowers. He then tried to create garland with different colours by using red and white oleander flowers while using notch leaves for green colour. And so, started the endless saga of Thovalai Maanikka Maalai.

Ever since, the family of Shri. Palani Pandaram has been making this garland. Currently, it is being progressed by Mrs M.T.Vaniitha Sree, a young woman in her thirties and a forebearer of the family name. She started learning this craft from her father Shri. M.Muthumperumal when she was 12 years old. She is an excellent talent in natural flower garland making and has been doing it for years now.

Linkage with Sree Padmanabhaswamy Temple:

Sree Padmanabhaswamy Temple is one of the most famous and oldest temples of not just India but the entire world. The same is proved by the fact that it finds multiple mentions in Epics, Puranas, Srimad Bhagavatha, etc. While it is considered impossible to find the exact date of this temple's creation, it goes back to at least 1050 A.D. The temple is highly revered among devotees and holds a special value among the Indian culture. Thovalai Maanika Maalai has been attached with the Sree Padmanabhaswamy Temple for around 146 years. The garland has been a part of the annual 10-day Urthsavam festival and Mahara Sankaranthi celebrations since 1845. The same has been stated and testified by the temple authorities in the affidavit attached as Annexure C.

Thovalai Maanika Maalai's 140 plus year old history is a strong proof of its origin. It highlights the history of the garland artform and proves that the product is worthy of GI registration.

Numerous features:

Over the years, Thovalai Maanikka Maalai has found mention in multiple newspapers, gazetteers, journals and articles. This points towards the widespread history of the garland making art and its recognition. Few pictures of the same have been enclosed herein as **Annexure D**.

Awards and Recognition:

Thovala Maanikka Maalai has gained vast recognition over the years. The forebearers of the artform have been awarded and honoured for their skill by multiple government and non-government organisations. The same demonstrates and adds to the history of the old Thovalai Maanikka Maalai.

Here are some of the many awards that they have received:

List of Awards won:

- National award (1988) from Ministry of Textiles Government of India, Delhi
- Living Crafts Treasure Award (2017-18) from The Tamil Nadu Handicrafts Development Corporation Limited, Chennai
- Poompuhar State Award (2013-14) from The Tamil Nadu Handicrafts Development Corporation Limited, Chennai
- Poompuhar District Award(2016-17) The Tamil Nadu Handicrafts Development Corporation Limited, Chennai*
- FLORA FLORA Award (2003) From RAMOJI Film City Hyderabad
- Best Trainer Award (2012) From Government Museum Chennai, Poompuhar & World Crafts Council
- Award of Excellence (2013) From Crafts Council of Tamil Nadu, Coimbatore
- KAMALA DEVI Award (2014) From Crafts Council of India, Chennai.
- Gen next Award (2013-14) From Tholil Thurai Amaichar, Tamil Nadu Government
- Arts and Culture department- Drawing of the Maanika Maalai accepted. Marabu Vali Oviyam Award (Kalai chemmal) (2015-16)
- Best organization- Sigaram (2018) From Aarogya educational trust.

Thovalai Maanikka Maalai is a recognized and widely-known form of art. It is a skill that not everyone possesses. *Thovalai Maanikka Maalai* is made only in a certain region of the country. It has a long history of existence. It is different from other garlands because of its special characteristics i.e., its shape, price, flower folding technique etc.

* A competition is held and only the top 5 artists are presented with this Award.

I) **Method of Production:**

Materials required:

1. Oleander and rose flowers
2. Nochi leaves
3. Chamba fibre

Step by step process:

Collection of Flowers:

The first step of creating Thovalai Maanikka Maalai is to collect the needed flowers. It should not come as a surprise that flowers play an important role in the process of making the garland. As mentioned earlier, the only flowers used in the garland are red and white oleander and taj mahal rose. The flowers are bought from the local market of Thovalai. The town is popular for its abundance of multiple varieties of flowers. The flowers of the right shape and size are sourced from the areas surrounding Thovalai.

Collection of Nochi leaves:

Nochi leaves are botanically known as vitex negundo. The leaves are locally sourced by the garland-makers. They pluck the leaves from the plants that are available nearby. Nochi leaves are responsible for the green colour that is used in Thovalai Maanikka Maala.

Sourcing of Chamba fibre:

The Chamba fibre is used to weave the flowers together in a row. The fibre is sourced from the nearby areas of Kanyakumari district. The inventor of the technique finally decided on chamba fibre after multiple hits and miss moments with other fibres. Now, Chamba fibre is used to sew the flowers and petals so as to get the desired garland shape.

After all the raw materials have been collected, the garland maker draws a pattern on the paper. Once satisfied with the design, the garland maker starts weaving the flowers and petal together.

STEPS

STEP 1: First step is to Select four thin samba fibres and knot them together at one end.

STEP 2: Each green nochi leaf is folded in the middle as shown in the picture. The leaf is laterally folded or curled as the arrows indicate to form a conical shape.

STEP 3: Place the leaf in front of the knotted fibres. Being the two extreme fibres to the front as the arrows indicate. The two central fibres descend following the direction of the central arrow. This keeps the leaf firmly in position.

STEP 4: Using a criss-cross pattern, the fibre is placed outwards on the two extreme ends.

STEP 5: The leaf is then bent and the fibres are worked on the in the same manner as mentioned above.

STEP 6: Select a flower and place it next to the leaf. The tying technique is repeated using a colour counting scheme called '*thethi*'. After specific colour counts, the flower can be changed with that of a different colour based on the design. Leaves and the folded petal and leaves open at the lower end. A single row of Thovalai Maanikka Maalai has now been created.

STEP 7: Following the same procedure, the creators make arrange the flowers in multiple rows. Mostly, they are arranged in five rows, though sometimes seven or eleven rows are used. When multiple rows are ready, they are joined together by inserting coconut palm sticks at regular intervals, preferably in dark-coloured areas like in the green patches so the sticks are concealed.

The sticks hold the garland flat like a tapestry. Once the desired shape is achieved, the ends are trimmed neatly and the samba fibres at the top and bottom is tied into a single bunch.

STEP 8: This panel of Thovalai Maanikka Maalai is attached to other similar ones to create a garland pattern.

STEP 9: Eventually, the tassels are tied together to allow them to move freely from both ends. And so, the final product is received.

To create a *Thovalai Maanikka Maalai* is a complicated process that takes hours of work. Sometimes, depending on the occasion and size of the garland, it can take up to as much as 24 hours of constant work to create a garland. Further, since *Thovalai Maanikka Maalai* is made from completely natural flowers, it cannot be parcelled to places. In almost all cases, the craft-holder goes to the place where the garland is needed, stays there and then creates fresh garlands for instant use. (Long distance they will go, Near kanyakumari Thirunelveli district-parcel in banana leaf)

J) Uniqueness:

It is humbly submitted that Thovalai Maanikka Maalai is unique because it is different from any other garland. It involves a special technique that takes time to master and is known by only a few. It is made only in a specific part of the world, more precisely, in the small village of Thovalai. Its uniqueness lies in its exclusivity.

The main qualities that distinguish Thovalai Maanikka Maalai from other garlands are –

Flowers used:

Usually, garlands are made from almost kind of flowers including but not limited to marigold, frangipani, paras, jasmine, spider lilies etc. However, in Thovalai Maanikka Maalai, only a certain kind of flowers and petals are used. Makers of Thovalai Maanikka Maalai use red and white coloured oleander flower. They also use rose petals of the 'taj mahal' variety of roses. Apart from this, they use nochil leaves for green colour. The string used to weave the flowers together is of chamba fibre.

Flower folding:

In Thovalai Maanikka Maalai, the petals and flowers are folded in such a way that they look like precious stones. Unlike other garlands, Thovalai Maanikka Maalai is known for its speciality in flower arrangement. The skill takes at least two to three months to learn as there is a high chance of breaking the flower when folding it. Thus, the final product coupled with the underlying skill makes Thovalai Maanikka Maalai distinctive in nature.

String:

In a normal garland, the string used to weave the flowers together is very evidently visible. But in Thovalai Maanikka Maalai, one can hardly see the string through which the petals and flowers are put together. The string used is of Chamba fibre which is sourced from the nearby water bodies.

Shape:

When you see a usual garland, its flowers are weaved together in a round fashion giving the garland a tube like shape. However, in Thovalai Maanikka Maalai, the flowers and petals are weaved together in such a manner that the garland is mat-shaped or flat.

Price:

A Thovalai Maanikka Maalai starts from 500 rupees. The price of a marriage Thovalai Maanikka Maalai stays around 3 to 4 thousand rupees. A Thovalai Maanikka Maalai can go up to as much as 10 thousand rupees. Compared to other normal garlands, the price range of Thovalai Maanikka Maalai is very high. One can buy a normal garland for around 200 rupees in the market. The high price of Thovalai Maanikka Maalai is justified by the time that goes in the making of a garland. If not done with accuracy and precision, the entire garland will fall apart. Thus, it is only after hours of hard work and focused attention that a Thovalai Maanikka Maalai comes into being, explaining why it is so priced.

Due to its uniqueness, the members of the applicant member family have been conferred with numerous awards over time.

K) Inspection Body:

In future the inspection body will be formed which may be constituted by the below mentioned persons to keep the check upon the quality of the products.

1. One member from MSME Intellectual Property Facilitation Centre, Guindy, Chennai – 32.
2. District Development Manager, NABARD, Kanyakumari District.
3. One member from Tamil Nadu Agricultural University, Coimbatore
4. One member from Directorate of Horticulture, Tamil Nadu
5. One member from the local association of Thovalai Manikkamalai Kaivinai Kalaingargal Nalasangam
6. One member from Sulashana Panneer Selvam, IPR for Agriculture and Rural Development Centre.
7. Two Horticulture Scientists
8. One member from the District Administrative Department, Kanyakumari District

This inspection body formed by the applicant will be acting independently to ensure the quality check upon the goods and the applicant also undertakes that the inspection body will keep the check on the quality, manufacturing, and mechanism of the goods. The above-mentioned persons may constitute the inspection body.

L) Others:

TRAINING WORKSHOPS:

The members of the Applicant association have been a part of multiple demonstrations and training programmes. So far, more than 250 people have been trained and constant efforts are being made to teach this art form on a larger scale.

They have given training workshops at the following places:

1. World Crafts Council (WCC), Chennai.
2. The Crafts Council of India (CCI), Chennai.
3. The Crafts Council of Tamil Nadu (CCTN), Coimbatore.
4. Mahabharata Utsav, Bangaluru.
5. Lady Sivaswami Iyer Girls Higher Secondary School, Mylapore, Chennai.
6. NKT National Girls Higher Secondary School Triplicane, Chennai.
7. Pushpa Bitan Friendship Society, Kolkata

DEMONSTRATIONS AND EXHIBITIONS

1. FLORA FLORA Flower Carnival -2003 conducted by RAMOJI Film City - Hyderabad

2. 42nd Annual Flower, Fruits and Vegetable Show – 2004 conducted by Kottayam Agri – Horticultural Society –Thiruvananthapuram
3. Mahabharat Utsav – 2005 conducted by Mahabharata Samshodhana Pratisthanam – Bengaluru
4. “CHAMPA” Workshop – 2005 conducted by Crafts Council of India,
5. PUSHPANJALI Exhibition-2005 conducted by Crafts Council of Tamilnadu-Coimbatore
6. CRAFTS BAZAR Workshop-2010 conducted by Crafts Council of India, Chennai.
7. Local Level Marketing Workshop- 2011 conducted by Government of India, Ministry of Textiles Office of the Development Commissioner (Handicrafts)- Kanyakumari.
8. PARIJAATHAM Flower Workshop-2012 conducted by Government Museum, Poompuhar & World Crafts Council –Chennai.
9. Maanikka Malai Workshop -2014 conducted by Crafts Council of Tamil Nadu, Coimbatore.
10. Maanikka Maalai Project -2014 conducted by Craft Council of Tamil Nadu & D J Academy Students, Coimbatore

Prime Minister Modi's Recognition of Thovalai Maanikka Maalai:

Prime Minister Modi, recognizing the importance of Indian traditions, took a moment to highlight the Thovalai Maanikka Maalai as part of the Tamil traditional arts. He pointed to the Chinese President and made an important remark, saying, "In the Indian tradition, flower garlands have significance," underscoring how garlands hold a place of pride in India's cultural and religious practices.

he 2019 Mahabalipuram visit was a pivotal moment for the Thovalai Maanikka Maalai, as it earned recognition on a global stage. Prime Minister Modi's special mention of this garland, along with the attention it received in the media, brought the world's focus on the unique craftsmanship of Thovalai's artisans. The garland, symbolizing purity, beauty, and Tamil cultural heritage, was thus elevated as a cultural treasure for the world to appreciate. This act of highlighting the Thovalai Maanikka Maalai not only symbolized India's cultural richness but also celebrated the artistry and heritage of the artisans of Thovalai.

Global Attention and Media Coverage:

The event was widely covered by the media, with major news websites and newspapers highlighting the cultural exchange between India and China during the visit. The garland's inclusion in this significant diplomatic event further reinforced its importance as an iconic piece of Tamil traditional art.

The Government of India recently also sought help from the applicant members for a documentary entitled “The Flowers and The Gemstones” being produced by the Films Division, Ministry of Information & Broadcasting.

INDIA TAMIL NADU KANNIYAKUMARI DISTRICT

Kilometers
0 5 10

No. of Taluks	4
No. of Towns	63
No. of Villages	76
Total Population	1 676 634



- Boundary, State ————
 District ————
 Taluk ————
 Headquarters, District ————
 Taluk ————
 National Highway ————
 State Highway ————
 Important Metalled Road ————
 Railway line, Broad gauge ————
 River and Stream ————
 Villages having 5,000 & above pop. with name ————
 Towns with name ————
 Degree College, Technical Institute ————

- TOWNS WITH POPULATION SIZE AND CLASS**
- CLASS I (Pop. 100 000 & Above)
 - CLASS III (Pop. 20 000 - 49 999)
 - CLASS IV (Pop. 10 000 - 19 999)
 - CLASS V (Pop. 5 000 - 9 999)

District headquarters is also Taluk headquarters

G.I. APPLICATION NUMBER – 817

Application Date: 13-01-2023

Application is made by Tamil Nadu Agricultural University at Lawley Road, District: Coimbatore – 641 003, Tamil Nadu, India for Registration in Part - A of the Register of **Kumbakonam Vetrilai (Kumbakonam Betel Leaf)** under Application No. 817 in respect of Betel Leaf falling in Class – 31 is hereby advertised as accepted under Sub-section (1) of Section 13 of Geographical Indications of Goods (Registration and Protection) Act, 1999.

- A) Name of the Applicant :** Kumbakonam Vetrilai (Betel leaf)
Urpathiyalargal Nalasangam,
- B) Address :** Kumbakonam Vetrilai (Betel leaf)
Urpathiyalargal Nalasangam No.26,
Melavtrniya Theru, Ayyampettai Thanjaore
614 201, Tamilnadu, India

Facilitated By:

Tamil Nadu Agricultural University,
Coimbatore

- C) Name of the Geographical Indication :**

KUMBAKONAM VETRILAI (KUMBAKONAM BETEL LEAF)



- D) Types of Goods :** **Class 31 – Betel Leaf**

- E) Specification:**

Betel vine, specifically Kumbakonam Vetrilai, is a key agricultural product from Tamil Nadu, celebrated for its superior taste, freshness, and cultural significance. Its cultivation along the Cauvery River has made it an integral part of local life and a testament to the region's agricultural heritage.

Betel Vine (Piper betel L.)

Kingdom: Plantae

Family: Piperaceae

Genus: Piper

Species: P. betel

Botanical Name: Piper betel L.

Varieties:

- Vellaikodi
- Pachaikodi
- Nattukodi
- Karpoori (Traditional clones)
- Sirugamani 1 (SGM 1)
- Sirugamani 2 (SGM 2)

These varieties are found primarily in Tamil Nadu, particularly in the Cauvery Delta region.

The betel vine is a dioecious, shade-loving, perennial root climber belonging to the Piperaceae family, known for its heart-shaped, deep green leaves commonly called "Vetrilai" in Tamil. This plant is historically significant, serving as a cash crop and traditionally cultivated in Tamil Nadu. It is labor-intensive, with roots that climb short distances to attach to nearby structures or supports.

Cultivation Region: Kumbakonam Vetrilai (Vellaikodi) Betel vine is grown extensively along the Cauvery River in the Cauvery Delta region, specifically in areas like Thiruvaiyaru, Papanasam, Thiruvudaimarudhur, Kumbakonam, and Valaigaman blocks of Thanjavur and Tiruvarur districts.

Historical Significance: The variety Kumbakonam Vetrilai (Vellaikodi) is a local cultivar and is celebrated in Tamil literary works and songs, especially extolled by the poet Mahakavi Bharathiyar in the early 1900s. Its cultivation has been passed down through generations, and it has become a symbol of Tamil agricultural heritage.

Market and Reputation: This variety is renowned for its superior freshness, taste, and quality, and has gained international recognition. The quality is attributed to the fertile soil, excellent drainage systems, and the pure water of the Cauvery River.

Cultivation and Cropping Pattern:

Cropping Cycle: Farmers typically cultivate betel vine for three years followed by one season of paddy cultivation, then resume betel vine planting. This Betelvine-Paddy cropping pattern is commonly practiced in the region.

Environmental Factors: The land's proximity to the Cauvery and Arasalar rivers, combined with the rich cultural heritage of Kumbakonam, makes this area ideal for betel vine cultivation.

Growth Parameters of Vellaikodi:

- Vine Length: 175.91 cm
- Leaf Dimensions:
 - Length: 11.04 cm
 - Breadth: 7.73 cm
 - Area: 55.71 cm²
- Leaf Yield:
 - Fresh weight of 100 leaves: 185.33 g
 - Leaf yield per plant: 28.33 leaves
 - Leaf yield per plot: 1445.83 leaves
 - Estimated yield per hectare: 178,309.80 leaves
- Weight:
 - Single leaf fresh weight: 2.04 g

- Single leaf dry weight: 0.45 g
- Petiole Length: 3.70 cm
- Number of Nodes per Vine: 15
- Number of Laterals per Vine: 1.76
- Source: Mahalakshmi et al., 2019
- Characteristics of Kumbakonam Vetrilai (Vellaikodi):
- Shape: Oblong/ovate
- Color: Green to yellowish-green
- Texture: Medium
- Thickness: Medium
- Taste: Pungent
- Chewing Quality: Moderate
- Shelf Life: 4-5 days for market distribution

The unique taste, freshness, and quality of Kumbakonam Vetrilai have made it highly sought after, with farmers harvesting younger leaves every 14 days to meet market demand. The variety has a significant place in both local culture and global markets.

F) Description:

Piper betel is a dioeciously and shade loving evergreen climber with a semi woody stem, climbing by short adventitious roots belonging to the Piperaceae. Green heart shaped betel leaf is known as “VETRILAI” in Tamil. Kumbakonam vettalai is a local and traditional cultivar that is grown particularly in the Kumbakonam region of Tamil Nadu by small and marginal farmers. Kumbakonam Vetrilai is one of the famous Piper Betel leaves in the whole of India. There are two types of Vetrilai the one which is dark green in colour and the one which is light greenish colour is known to be male Vetrilai. Male flowers are dense with two stamens and female long, pendulous ones having a single ovary. Kumbakonam betel leaves, heart-shaped and tender in form, are tall vines going up to a metre.

Grading of Betel leaves – Kumbakonam Vetrilai	
Kolundhu vetrilai	The leaf emerges from 20- 25 days from planting
Maaruvethalai	First picking from 7 th -12 th month which is bigger in size, more shelf life (6-7 days), and fetch high market price than other grades
Kelavethalai	Leaves harvested from 2 nd year
Kattavethalai	Leaves harvested during last 6 months which is small in size.

Analysis on Nutritive Information- Pharmacognostical and Phyto-physicochemical profile of the leaves of Piper betel L. var **Vellai Kodi** – Kumbakonam betel (Piperaceae)

S.No.	Parameters	Kumbakonam Vetrilai - Vellai Kodi
1	Crude fibre	1.42%
2.	Ash	1.86%
3.	Carbohydrate	2.72%
4.	Protein	2.89%
5	Calorific value	47.82 (kcal/100g)
6.	Vitamin C	30.45 mg / 100 ml
7.	Carotene (Vit-A)	47.16 IU
8.	Total Phenols	201.01 mg/100g

9.	Tannins	112.82 mg /100g
10.	Total antioxidant activity	2340.91 µg/g
11.	Colour Value	
	L	23.9
	a	-2.7
	b	15.7
	c	16.0
12	Mineral profile	
	Magnesium (ppm)	270.66
	Aluminum (ppm)	85.37
	sodium(ppm)	6.55
	Barium (ppm)	3.06
	zinc(ppm)	4.60
	Lead (ppm)	.14
	Manganese (ppm)	7.81
	Potassium(ppm)	1723.74
	Copper (ppm)	36.69
	Molybdenum (ppm)	0.20
	Boron (ppm)	2.30
	Selenium (ppm)	0.09
	Iron (ppm)	81.51
	Calcium (ppm)	86.88
	Lithium (ppm)	0.02

Vellaikodi has rich source of minerals specially calcium, iron, potassium, other nutrients such as Vitamin A, C, total phenols and tannin and antioxidant property.

Leaf oil Characteristics - Organoleptic and Physical analysis of leaf oil of Piper betle L (Vellaikodi)

Organoleptic Property/ Physical constant	Description/ Value
Color	Colorless to pale yellow
Odour	Strong aromatic odor
Taste	Pungent
Characteristic feel	Greasy
Solubility	Immiscible in water and freely soluble in organic solvent
Specific gravity	1.0010
Optical activity	+4.392
Refractive index	1.529
Percentage yield	0.3144 % v/w

Chemical Composition of betel oil (Vellaikodi):

There are two predominant components found in the Vellaikodi betel leaf essential oil. They are 5-(2-propenyl)-1,3-benzodioxole, 25.67% in the 100 % oil as the first major constituent followed by Eugenol which is 18.27% and 2-methoxy-4-(2-propenyl) acetate-phenol (8 %). The antimicrobial potential of Piper betle oil (vellaikodi variety) oil against dental pathogens such as *Staphylococcus aureus*, *Streptococcus mutans*, *Lactobacillus acidophilus*, *Candida albicans*, and *Saccharomyces cerevisiae* was found significant and prominent due to presence of high 5-(2propenyl)- 1,3-benzodioxole content. It may serve as a source of antimicrobial agent for dental caries in commercial toothpaste to get maximum activity against dental pathogens.

Block wise Soil Characteristics pertain to Kumbakonam betel leaf (Vellaikodi)

BLOCKS	pH	EC (dS/m)	Organic Carbon (%)	N (Kg/Ha)	P (Kg/Ha)	K (Kg/Ha)	Sulphur (mg/Kg)
Thiruvaiyaru	Alkaline (> 7.5)	Non-Saline (< 1.0)	Medium (0.5-0.75)	Low (<118)	High (> 22)	Medium to High (118- 280)	Deficient (<10)
Papanasam	Neutral (6.5-7.5)	Non -Saline (< 1.0)	High (> 0.75)	Low (<118)	High (> 22)	Medium (118- 280)	Moderate (10-15)
Kumbakonam	Neutral (6.5-7.5)	Non -Saline (< 1.0)	High (> 0.75)	Medium (<118)	Medium (11-22)	Medium (118- 280)	Deficient (<10)
Thiruvudai maruthur	Neutral to alkaline (6.5-7.5)	Non -Saline (< 1.0)	High (> 0.75)	Low to Medium (<118)	Medium to High (11-22)	Medium to High (118- 280)	Sufficient (> 15)
Valangaiman	Neutral to alkaline (6.5-7.5)	Non -Saline (< 1.0)	Medium to High (> 0.75)	Low (<118)	Medium to High (11-22)	Medium to High (118- 280)	Sufficient (> 15)

G) Geographical area of Production and Map as shown in page no:

Kumbakonam vettalai or vetrilai in Tamil is famously called by name due to arrival of betel from the villages nearby which is abundantly cultivated specially in villages namely, Thiruvallampozhil, Nadukaveri, Achanur Maanarsamudhram, Valappakudi, Karruppur in Thiruvaiyaru block, Rajagiri, Pandaravadai, Elankarkudi, Vanniyadi in Papanasam Block, Natchiyarkoil, suriyankoil villages of Thiruvudaimaruthur block of Thanjavur district in and around Kumbakonam and Valagaiman Block of Thiruvallur district near Kumbakonam covers Govindagudi and Avur.

H) Proof of Origin (Historical records):

Kumbakonam apart from being the city of temples is also noted for quality betel leaves. Kumbakonam betel leaves' history can be traced back to centuries. The 'District Manual' written by Diwan Bahadur T. Venkavami Rao, was published in 1883. It is one of the many sources of information for the *Tanjore Gazetteer* (2000), published by Rani Kapoor for Cosmo Publications (Div. of Genesis Publishing Pvt. Ltd.; New Delhi, India), which mentions that besides paddy, the crops generally grown on wetlands are sugarcane and betel vine. It further goes on to mention that Kumbakonam betel has a high reputation. The Gazetteer mentions that a dry crop is sometimes grown on irrigated lands as supplementary to a wet crop. However, there is hardly any rotation of crops in wet fields. Thus, as a rule paddy is grown year after year and sugarcane or betel whenever convenience demands. After betel (which stands on the ground for three years) an interval of two or three years is necessary before this crop is cultivated on it again. This does not prevent it from being cultivated with paddy in the interim. Hence, the origin of Kumbakonam Betel Leaves can be traced back before the 19th century.

In the *Tanjore Gazetteer* (2002), published by Genesis Publishing Pvt. Ltd., F. R. Hemingway has mentioned that Kumbakonam betel has a high reputation with unique features in the markets of the betel leaf sellers.

In the ancient time, Tamil people used to have betel leaves in marriage rites were carried out by this betel leaf. The bridegroom takes the thali strung with turmeric and betel leaves with a bunch of flowers. The bridegroom is given the thali kept upon the betel leaves. This shows that betel leaf has its origin from time immemorial. The betel leaves and areca nuts are used

ceremonially in traditional weddings. Based on a folk tale about the origins of these plants, the groom traditionally offers the bride's parents betel leaves and areca nuts (among other things) in exchange for the bride. The betel and areca nut are praised as an ideal combination symbolizing a married couple bound together in love (Source: Castes and Tribes of Southern India, Volume I By Edgar Thurston, K. Rangachari)

Many traditional ceremonies governing the lives of Hindus use betel leaves and areca nuts. This had been a traditional practice from back to centuries. In order to pay the priest in the temple, devotees place the money in the betel leaves and then put that beside the priest.

The tender betel leaves from Kumbakonam are dark to light green with a unique characteristic flavor. It has been very intimately connected with ancient Indian history, religion and culture. Marcopolo (1295 AD) took notice of the betel leaf chewing habit of the people in south India. Betel vine has been under cultivation in India for centuries. In fact, no Hindu religious ceremony is complete without betel leaf. It is also offered after lunch and dinner and also during other social gatherings. The fresh crushed leaves are used as antiseptic for cuts and wounds.

In the research paper named **"Piper Betel Linn (Betel Vine), the Malignated Southeast Asian Medicinal Plant Possesses Cancer Preventive Effects: Time to Reconsider the Wronged Opinion"** authored by Manoj P Rai, Karadka Ramdas Thilakchand. Princy L Palatty, Prathima Rao, Suresh Rao, Harshith P Bhat, Manjeshwar Shrinath Baliga it has been mentioned that in India it is customary to serve betel leaf on various social, cultural and religious occasions and is also offered to guests as a mark of respect. Based on the color, size, taste and aroma there are many.

It is also good for the respiratory system and is used in treatment of bronchitis, cough and cold. In India, it is widely cultivated in Tamil Nadu (majorly in Kumbakonam of Tanjore district), offering betel morsels to guests in the Indian subcontinent is a common courtesy. The betel plant is currently extensively cultivated in India.

For many the experience of a good meal is incomplete without "Vettalai-paakku." Vettalaipaakku is made by patiently wiping the betel leaf, applying the right amount of sunnambu, placing betel nuts and folding the leaf into four. This helps with digestion and gives the consumer the satisfaction of a complete meal. From marriages and other special occasions to songs in Tamil movies, Kumbakonam Betel leaves have been a part and parcel of many lives. Betel leaves have the medicinal property to cure cold, cough, skin diseases and indigestion. The betel leaf is consumed by people all over India. Further, it is also being exported to other countries.

In 1977, the Archeology Department published a book, "Varalatrilvettilai" by M Chandra Moorthy outlining the history and significance of Kumbakonam betel leaf. The author explains the vital role that the betel leaf plays in the culture and tradition of South India. It is a very old practice to use betel leaf in places all over India for various occasions like marriage functions, funerals etc. It is followed by people of all communities in the Hindu religion. It further talks about the difficulties of cultivating betel leaves. Planting a betel leaf plant is not an easy job to do. So it was done only in very few places. The betel leaves which are cultivated in the areas of Tamil Nadu were sent even to the areas of Maharashtra for sale. Further, it is pertinent to note that the stone inscriptions in the Parthasarathi Temple located in the area of present day Triplicane, which was written in the year 13 AD, has mentioned about the use of betel leaf with tobacco for various purposes. A temple named Anuramman, in the river banks of Noyyal river which is located in the area of Tharapuram in the district of Thiruppur. The one who

built the temple was Azhagan Sarkarai uththamakaaminda Manruttayar in 1559 which also mentions the use of betel leaf in various occasions. (Figure 2)

The Kumbakonam Betel leaf has also found a place in the works one of the great poets of India Mahakavi Bharathiyar, In the early 1900s he wrote a song about the cultivation of wheat in the banks of river Ganga and cultivation of betel leaf in the banks of the Cauvery river. The following is the excerpt from a song written by Mahakavi Bharathiyar:

Transliteration in English:

*“sindhu nadhiyin misai nilavinilae
chaera nannaatilam pengaludanae
sundharath thelunginil paattisaiththu
thoanigaloatti vilaiyaadi varuvoam
gangai nadhippuraththu goadhumaippandam
kaaviri vetrilaikku maaru kolluvoam
singa maraatiyartham kavidhaikondur
saeraththu thandhangal parisalippoam”*

It is evident from the above poem by Mahakavi Bharathiar, a great poet is that Kumbakonam and nearby blocks has a rich history of cultivating betel leaf as it is situated on the banks of river Cauvery.

Research articles

1. Studies on phytochemistry and bioefficacy of cultivars of *Piper betel*, Prakash UN, Smila KH, Priyanka JD, Srinithya B, Sripriya N
2. Pharma cognostical and Phyto-physicochemical profile of the leaves of *Piper betel* L. var Pachaikodi (Piperaceae) - Valuable assessment of its quality, K. Periyannayagam, M. Jagadeesan, S. Kavimani, T. Vetrivelan
3. Effect of *Piper Betel* Leaf Extract on Physico - Chemical and Microbial Quality of Milk, D. Baskaran & N. Suja
4. Antioxidant activity of eugenol in *Piper Betel* leaf extract, Anjum Aara , Vani Chappidi, Madhavan N. Ramadas
5. Isolation and characterization of major phytochemicals from the leaves of *Piper betel*. Linn, Srinivasan Srividya, Subramanian Iyyam Pillai and Sorimuthu Pillai Subramaniana
6. *Piper betel* Linn. A maligned pan-asiatic plant with an array of pharmacological activities and prospects for drug discovery, Nikhil Kumar, Pragya Misra, Anuradha Dube, Shailja Bhattacharya, Madhu Dikshit and Shirish Ranade
7. Efficacy of salivary and diastase extracts of *Piper betel* in modulating the cellular stress in placental trophoblast during preeclampsia, Padmini Ekambaram and Chithra Balan
8. Phytochemical Analysis, Identification and Quantification of Antibacterial Active Compounds in Betel Leaves, *Piper betel* Methanolic Extract, A Syahidah C R Saad, M D Hassan, Y Rukayadi, M H Norazian,, M S Kamarudin
9. Effect of organic manures and nutrients on growth and yield of betelvine (*Piper betel* L., M.Mahalakshmi, R.Chitra, P.Jansi Rani and D.Janaki
10. SGM.BV.2-A New Promising betelvine Variety R.Arulmozhiyan, R.Chitra, K.Prabkar, S.Mohamad Jalaludin and D.Packiaraj .
11. Chemical Composition and antimicrobial activity of vellaikodi variety of *Piper betel* Linn Leaf oil against dental pathogens Sugumaram M, Sureh Gandhi M, Sankaranarayanan K, Yogesh M, Poornima M, Sree Rama rajasekhar

I) **Method of Production:**

SOIL AND CLIMATE

Betelvine is grown in sandy, clay and loamy soil. Well drained fertile clay loams are suitable. Betelvine require a cool humid with considerable humidity and regular supply of moisture in the soil is essential. The district has covered by sedimentary formations of tertiary and alluvial deposits by more than 90 per cent and has humid and tropical climate. The relative humidity varies between 70 and 85 per cent.

LAND PREPARATION

Land is ploughed for 3-4 times, to get fine tilth. Open deep trenches as beds are called Pattam in tamil is being prepared for 3 ft depth and has 18 x 6 ft size for growing betel vine. The number of pattam for one acre of cultivation is about 450 – 500. Betel vine is being cultivated in generation together by the farmers. The rental value of land per pattam is Rs. 150 per year. It is grown with the life support of Agathi – *Sesbania grandiflora* L.

PLANTING

'Vellaikodi' is the common name of Kumbakoanm betel local variety grown in this region. Five nodes of betel vine seedlings are planted in Puratasi pattam (Tamil Month) and 45th day nodes started emerges leaves and 9th month onwards plucking of leaves started and it goes for about 3 months. The number of betel vines planted per pattam is about 50 Nos. Seedlings taken from own land having 10 month old plantation commonly known as 'Maaruvethalai' or it is obtained from neighbor farmers for planting. Vines are regularly tied regularly with dried banana fibre in every 15 days to grow faster. Betel vine grown for about 2 ½ to 3 years. Usually planted in Puratassi (Tamil month) i.e., Mid Sept to Mid Oct to Chithirai month i.e., Mid April to Mid-May. Banana suckers are planted for providing shade to the betel vine. One banana sucker is planted for 7 pattams.

ROTATION OF CROP

The crop stands for about 2 ½ to 3 years as one rotation. Then farmers change the crop to paddy, sugarcane, chilly, etc. Cultivator may be tenant or own land farmers, particularly marginal farmers. Leasing of land for about 3 years. On an average, 50 pattams will be handled by single cultivator. Due to capital and labour intensive crop, farmers are able to manage less than one acre under their maintenance.

Raising of Life support to betelvine

Agathi – *Sesbania grandiflora* L. is used as life support mechanism for supporting betel vine for climbing and seeds are sourced from Theni, Cumbum, Namakkal and Salem districts. Seed rate is 2-3 seeds/hill and on an average 4-5 kg/100 pattams are required. It is done during July-Aug or Mid Sept-Mid Oct before 45 days of planting vines.

IRRIGATION

The soil should be moist always and frequent irrigations is to be given daily, alternate days or once in three days by women labourer depending on the monsoon. However, beds and trenches should be free from waterlogging. The main source of irrigation is bore wells supplemented by Cauvery river canal system.

INTERCULTURAL OPERATIONS

Training and Pruning

Side branches of Agathi or Semba upto a height of 2 m are removed for the early creeping of vines. Tying (vittam kattudhal) 3-5 agathi/semba plant with the help of dried banana fibre at 20-30 cm intervals when vine trails up to a height of 2.22 m. It is done every 15-20 days. This system of trailing of vines is called "Vittam Kattudhal" in local language

Lowering of vines

After reaching the certain height of 3m, their leaf size, and production are reduced. Lowering is done during March-April. It produces new primary vines from the vine buried in the soil. Irrigation should be given after each lowering.

MANURING

The manures and fertilizers applied by the farmers at frequent intervals for better growth. Per acre application of inputs includes Fym (7t), Urea (150 kg), Compost (5kg), Phosphorus (250 kg), Potash (210 kg), Micronutrients (3kg), Factomphos (44 kg) which is applied during first and second year. FYM and Goat manure are applied as basal .others are applied in 3 months interval

PLANT PROTECTION CHEMICALS

Imidachloprid and thiamethoxam each (5 l /acre) are applied to reduce the pest incidences along with bio inputs such as neem cake.

GRADES IN BETEL VINE

The leaf emerges from 20- 25 days from planting is known as 'kolundhu vetrilai'. First picking from 7th -12th month is Maaruvethalai (Tamil) which is big in size, more shelf life (6-7days), and fetch high market price than others, followed by 2nd and 3rd year kelavethalai and last 6 months small in size kattavethalai (Tamil).

HARVESTING

Once in 20-25 days interval, leaves are harvested with an average of leaves. Average number of pickings will be 14 pickings per year. Plucked the mature greenish leaves along with a portion of petiole with an irupuli (the instrument used for harvesting of leaves). Marketing of leaves in local terms Kavuli (105-108 leaves) and Mutty (30 kavuli) (i.e) 3000-3024 leaves. The total cost of cultivation of Betel vine for one acre per year is Rs. 6,90,924.

AFTER HARVESTING

The picked leaves are washed, cleaned and graded according to their size in the farm itself. Packing of betel vine leaves with the help of dried banana leaves is done. 100-105 leaves are called 1 Kavuli. 30 kavuli is arranged in the dried banana leaves, covered and tied them with the help of banana fiber. The major wholesale market is Avur market in Valangaiman block, nearest to Kumbakonam and then it is distributed to other parts of Tamil Nadu to wholesalers and retailers.

J) Uniqueness:

Kumbakonam betel (Vellaikodi), cultivated in and around the Thanjavur and Tiruvarur districts of Tamil Nadu, especially near Kumbakonam, is recognized for its exceptional freshness, taste, and quality. The region's proximity to the Cauvery River provides rich, fertile soil and irrigation, contributing to the unique characteristics of the betel vine leaves. The area's natural resources, especially the river's water, enhance the soil's nutrient content, promoting the distinctive taste and texture of the leaves, making them a regional specialty.

Characteristics of Kumbakonam Vetrilai (Vellaikodi)

Pungency and Taste:

The leaves of Kumbakonam betel are oblong/ovate, typically green or yellowish-green, and have a pungent taste with moderate chewing quality. These leaves are prized for their medium texture and thickness, and they offer good flavor and overall consumer acceptance.

Harvesting Practices:

Kumbakonam farmers harvest younger betel leaves every 14 days due to high market demand, ensuring freshness and quality. This shorter harvesting interval helps fetch higher prices compared to the regular 21-day harvest cycle.

Shelf Life:

The shelf life of Kumbakonam Vetrilai is typically 4-5 days. To increase its shelf life and facilitate transportation, farmers employ traditional packaging methods. Leaves are arranged in circles (called "Kavuli"), with each set tied with dried banana leaves to maintain freshness. These bundles are then sent to wholesale markets like Avoor Market near Kumbakonam.

Nutritional and Medicinal Properties

Rich in Nutrients:

Kumbakonam betel leaves are a rich source of minerals such as calcium, iron, potassium, and essential vitamins like Vitamin A and C. Additionally, they contain total phenols and tannins, which provide antioxidant properties, promoting human health by combating bacterial and fungal infections.

Antimicrobial and Antioxidant Properties:

The essential oil of Vellaikodi betel leaf contains key bioactive compounds like:

5-(2-propenyl) 1,3-benzodioxole (25.67%)

Eugenol (18.27%)

2-methoxy-4-(2-propenyl) acetate-phenol (8%)

These compounds contribute to the leaf's antimicrobial potential, particularly against dental pathogens such as *Staphylococcus aureus*, *Streptococcus mutans*, *Lactobacillus acidophilus*, *Candida albicans*, and *Saccharomyces cerevisiae*. This antimicrobial activity makes Piper betle oil a promising candidate for inclusion in commercial toothpaste formulations to enhance their efficacy against dental issues.

Traditional Medicinal Uses:

Siddha Medicine: Betel leaves, including Kumbakonam Vetrilai, have a long history of use in Siddha medicine for treating various ailments. They are used for:

- Cough relief and dyspnoea (difficulty breathing) in children.
- Reducing excessive menstrual bleeding.
- Treating obesity and filariasis.
- Promoting oral health and healing wounds.

Antimicrobial and Antioxidant Activity: Research has shown that betel leaf extract, especially from the Vellaikodi variety, exhibits significant antibacterial, antifungal, and antioxidant activities. It contains bioactive compounds like eugenol and hydroxychavicol, which contribute to its antibacterial efficacy.

Health Benefits:

Betel leaves are beneficial in improving digestive health, acting as a carminative, expectorant, and anti-inflammatory agent. The leaves are also recommended in traditional medicine for treating asthma, oral infections, and pain relief.

Research Findings and Applications

Antibacterial and Anticandidal Activity:

Studies on the Vellaikodi variety have revealed its superior antibacterial and anticandidal activity, making it effective in fighting dental pathogens and potentially valuable in pharmaceutical products, such as toothpaste or mouthwash.

Milk Preservation:

Adding 1% betel leaf extract to raw milk has been shown to reduce milk acidity, thus extending its shelf life by delaying spoilage.

Phytochemical Composition:

The ethanolic extract of Piper betle leaves contains key secondary metabolites, including Caffeic acid, p-Coumaric acid, Rutin, Eugenol, and Hydroxychavicol. These compounds are known for their pharmacological properties and their potential to improve human health.

Research on Pregnancy and Stress:

Betel leaf extracts have shown promise in managing preeclamptic stress during pregnancy, highlighting its therapeutic potential in obstetrics.

Betel Vine Specialty Centre in Kumbakonam

A Betel Vine Specialty Centre is being established at Marudhanallur village, Sakkottai in Kumbakonam.

The key objectives of this center are:

- Training for betel farmers.
- Demonstration of improved farming practices.
- Introduction of new varieties and technologies.
- Research on Integrated Nutrient & Pest Management.

Focus on expanding betel vine cultivation in Thanjavur and Tiruvarur districts, which will enhance the livelihoods of local farmers.

Kumbakonam betel, especially the Vellaikodi variety, is a unique and valuable agricultural product. The fertile soil and irrigation from the Cauvery River contribute to its exceptional quality, making it a prized commodity in local and international markets. Beyond its culinary uses, the betel leaves' medicinal properties and antimicrobial potential further emphasize its significance in both traditional and modern health practices. The Betel Vine Specialty Centre initiative will help foster growth in the sector, benefiting local farmers and expanding the global reach of Kumbakonam betel.

K) Inspection Body:

The inspection body will be formed which may be constituted by the below mentioned persons to keep the check upon the quality of the products.

1. Chairman of the Inspection Body – District Collector
2. Director of CARDS, TNAU Coimbatore
3. District Development Manager, NABARD, Thanjavur.

4. One member from the local association from Thanjavur / Tiruvarur.
5. One member from Sulashana Panneer Selvam, IPR for Agriculture and Rural Development Centre (NGO)
6. DDH, Thanjavur
7. DDH, Tiruvarur

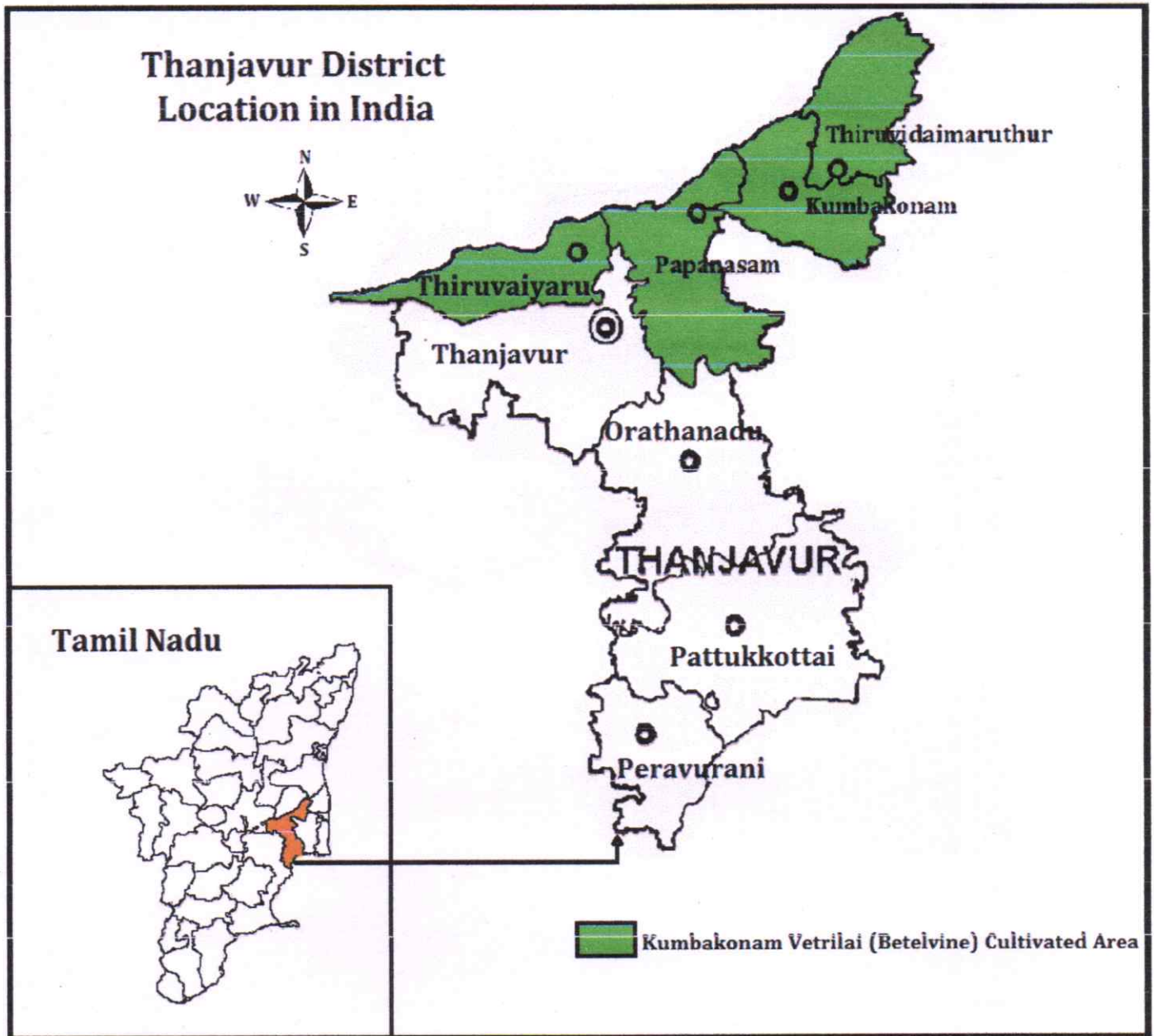
This inspection body formed by the applicant will be acting independently to ensure the quality check upon the goods and the applicant also undertakes that the inspection body will keep the check on the quality, manufacturing, and mechanism of the goods. The above mentioned persons may constitute the inspection body.

L) Others:

Cost of Cultivation and Marketing Practices

A detailed report on Economics and Marketing of Kumbakonam Betelvine Cultivation are attached based on the study entitled “Documentation of Select Agricultural Commodities in Tamil Nadu” operating in the Department of Agricultural Economics, TNAU, Coimbatore

KUMBAKONAM VETRILAI (Betelvine) CULTIVATION AREA THANJAVUR DISTRICT

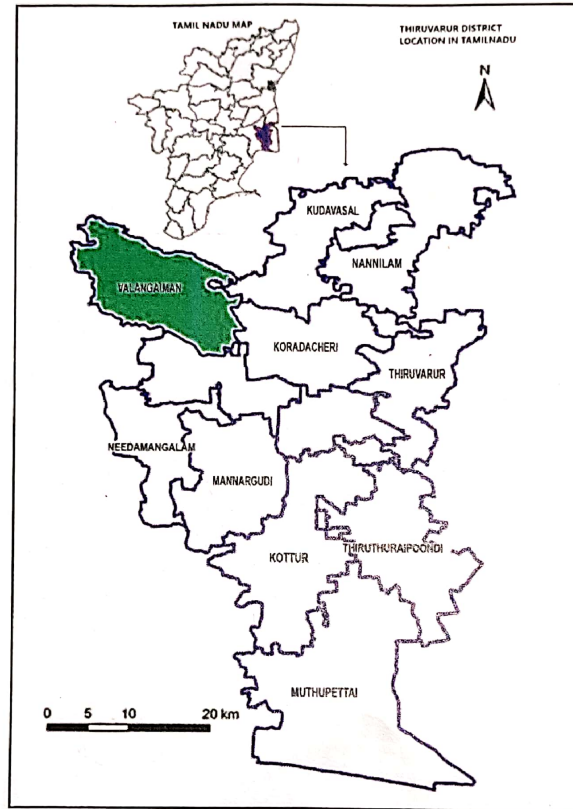


Latitude : 10.8402° to 11.0130°

Longitude : 79.9660° to 79.4449°

17/11/24
Deputy Director of Horticulture
THANJAVUR - 613 001

KUMBAKONAM VETRILAI (BETELVINE) CULTIVATION AREA VALANGAIMAN BLOCK, THIRUVARUR DISTRICT



Latitude:10.9040°

Longitude:79.3443°E



- Kumbakonam vetrilai (Betelvine) cultivated Area


Horticultural Officer
Valangaiman Block


Assistant Director of Horticulture
Kodavasal

G.I. APPLICATION NUMBER – 836

Application Date: 18-02-2022

Application is made by Tamil Nadu State Agricultural Marketing Board, Chief Executive Officer, Thiru Vi Ka Industrial Estate, Guindy, Chennai - 600 032, Tamil Nadu, India Maligampattu Farmer Producer Association at No.186, East Street, Maligampattu, Panruti, District: Cuddalore – 607 106, Tamil Nadu, India for Registration in Part - A of the Register of **Panruti Palappazham (Panruti Jack Fruit)** under Application No. 836 in respect of Jack Fruit falling in Class – 31 is hereby advertised as accepted under Sub-section (1) of Section 13 of Geographical Indications of Goods (Registration and Protection) Act, 1999.

- A) Name of the Applicant :**
1. Tamil Nadu State Agricultural Marketing Board
 2. Maligampattu Farmer Producer Association,
- B) Address :**
1. Tamil Nadu State Agricultural Marketing Board, Chief Executive Officer, Thiru Vi Ka Industrial Estate, Guindy, Chennai - 600 032, Tamil Nadu, India
 2. Maligampattu Farmer Producer Association, No.186, East Street, Maligampattu, Panruti, District: Cuddalore – 607 106, Tamil Nadu, India
- Facilitated By:**
NABARD Madurai Agri Business Incubation Forum, Madurai

- C) Name of the Geographical Indication :**
PANRUTI PALAPPAZHAM (PANRUTI JACK FRUIT)



- D) Types of Goods :** **Class 31 – Jack Fruit**
- E) Specification:**

Panruti, located in the Cuddalore district of Tamil Nadu, is renowned for its jackfruit production, with the region being one of the largest producers and exporters of this fruit in India. The green, unripe jackfruit is typically cooked as a vegetable, while the ripe fruit, with its sweetly acidic but mild pulp, is eaten fresh. The town itself is a business hub and has been for over 200 years, thriving especially due to its jackfruit and cashew industries.

The name "Panruti" is derived from the Tamil words "pan" (song) and "ruti" (music), possibly referring to the area's historical significance in the religious and cultural traditions of Tamil saints. It is believed that Panruti has one of the highest per capita consumptions of jackfruit in India.

Commercial cultivation of jackfruit is primarily concentrated in Panruti, where many farmers grow it as a mono-crop. Traditional varieties of jackfruit in the region bear fruit once a year, with flowering typically occurring between mid-November and mid-February. Tender jackfruit is available in the market from March to August, with the fruits ripening from June onward, though some late varieties may ripen as late as October.

In terms of advancements in jackfruit cultivation, the Tamil Nadu Agricultural University (TNAU) in Coimbatore has developed improved varieties such as Palur-1 and PPI Jack, which have shown promising results in the state.

The Panruti Jackfruit is renowned for its distinctive morphological features, which contribute to its recognition as a high-quality variety. Below are the key morphological characteristics of the Panruti Jackfruit:

1. Tree Characteristics:

Size: The jackfruit tree in Panruti typically grows to a medium to large size, reaching a height of about 15 to 20 meters.

Branching Structure: The tree has a broad, spreading canopy with thick, strong branches.

Leaves: The leaves are dark green, leathery, and glossy, with a slightly wavy margin. They are oblong to elliptical in shape, with prominent veins.

2. Flowering:

Flowering Time: The flowering season generally starts from mid-November to mid-February, depending on the variety and climatic conditions.

Flower Type: The jackfruit flowers are small, yellowish, and unisexual, with male and female flowers present on the same tree.

3. Fruit Characteristics:

Shape: The fruit of the Panruti jackfruit is oblong or oval-shaped. It can be quite large, often weighing between 10 to 50 kg, though smaller fruits also occur.

Size: The average fruit can measure around 50 cm in length and 30–40 cm in diameter, although the size varies.

Skin:

The skin of the unripe fruit is green and covered with prominent, hard spiny protrusions.

As the fruit ripens, the color transitions to a yellowish-brown hue, with a softer, more leathery texture.

Pulp: The pulp is arranged in compartments or segments around the seeds. It has a mildly fibrous texture, especially in the unripe state, and becomes tender and juicy when fully ripe.

The color of the ripe pulp is typically golden-yellow.

It is non-sticky, making it easier to handle compared to other varieties of jackfruit.

Seeds:

The seeds of the Panruti jackfruit are large, flat, and oval-shaped.

They are encased within the fibrous pulp and are typically white or light cream in color. The seeds are edible after boiling or roasting and are rich in starch.

4. **Fruit Ripening:**
Ripening Period: The Panruti jackfruit ripens from June to August for early varieties, with some late varieties ripening until October. The fruit has a relatively long ripening period compared to other varieties.
5. **Cultural and Seasonal Morphology:**
Mono-Cropping: In Panruti, jackfruit is often grown as a mono-crop, meaning that the region specializes in large-scale jackfruit cultivation, where trees are spaced to maximize fruit production.
Flowering and Fruiting Cycle: The traditional varieties bear fruit once a year, with flowering from mid-November and tender fruits available from March onwards.
6. **Overall Morphological Adaptation:**
The morphological features of the Panruti Jackfruit—such as its large size, thick skin, golden-yellow pulp, and distinctive shape—are ideal for the tropical climate of Tamil Nadu, where it thrives due to ample rainfall, heat, and humidity.

These characteristics make Panruti Jackfruit easily distinguishable and highly valued for both local consumption and export.

F) **Description:**

The Jack grows well and gives good yield in the warm humid climate of hill slopes and the hot humid climate of plains. The crop grows successfully from sea level up to an elevation of 1200m at an optimum temperature range of 22-35°C. It cannot tolerate frost or drought. The yield and quality of fruits are medium under low humidity. The West coast plains with high humidity are found to be highly suitable. The jackfruit tree flourishes in the rich, deep soil of medium or open texture, sometimes on deep gravelly or laterite soil. It will grow, but more slowly and not as tall in shallow limestone. In Cuddalore, they say that the tree grows tall and thin on the sand, short and thick on stony land. It cannot tolerate "wet feet". If the roots touch water, the tree will not bear fruit or may die. A deep rich alluvial or open textured loamy soil or red laterite soils with slightly acidic conditions (pH 6.0 – 6.5) with good drainage are ideal for jack fruit, however, it can come up in a variety of soils.

Morphological:

characteristic	Panruti Jackfruit
Geographical Location	Panruti, Cuddalore district, Tamil Nadu
Tree Height	30 to 70 feet
Canopy	Broad, dense canopy with large, dark green leaves
Bark	Rough, grayish-brown
Fruit Size	Medium to large, typically 10 to 30 kg
Fruit Shape	Oval to oblong
Fruit Surface Texture	Rough and prickly with prominent hexagonal patterns

Fruit Color (Unripe)	Green
Fruit Color (Ripe)	Yellowish-green to yellow
Pulp (Arils)	Bright golden yellow, juicy, and fleshy
Pulp Flavor	Sweet with a slightly tangy undertone
Seed	Oval, smooth, light brown, encased in a thin membrane
Leaf Size	6 to 12 inches long, 3 to 6 inches wide
Leaf Shape	Elliptical to oblong with a pointed tip and rounded base
Leaf Color	Dark green on the upper surface, lighter green underneath
Inflorescence Type	Monoecious (both male and female flowers on the same tree)
Male Flowers	Cylindrical spike, pale green when young, turning brown when mature
Female Flowers	Larger, rounder, pale green, developing into the fruit
Root System	Deep taproot with lateral roots spreading horizontally
Fruit Ripening Season	March to June, sometimes multiple yields per year

Panruti Jackfruit is better for its firm texture and versatility in cooking, while Tripura Jackfruit is preferred for its sweeter, softer pulp ideal for fresh consumption.

Varieties

Palur jack or PLR -1	Average fruit weight of 12 kg with 115- 120 flakes, off-season fruiting, TSS 19°Brix, golden yellow firm flakes fruits with good quality
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Palur.1 Jack is a clonal selection from Panikkankuppam local of Panruti taluk, South Arcot district. It is high yielding with medium height, less spreading and suitable for high density planting. In addition to regular bearing season (April-June), it gives yield during off season (Nov-Dec) also. The annual yield per tree is about 80 fruits weighing around 900kg. The average fruit weight is 12 kg containing 115-120 carpels. The off-season bearing is a unique trait of this variety and fetches premium price giving additional income to farmers. The fully ripe fruits have flat stigmatic surface instead of spiny surface

Physicochemical characteristics

Nutrients	Young fruit	Ripe fruit	Seed
Water (g)	76.2-85.2	72.0-94.0	51.0-64.5
Protein (g)	2.0-2.6	1.2-1.9	6.6-7.04
Fat (g)	0.1-0.6	0.1-0.4	0.40-0.43
Carbohydrate (g)	9.4-11.5	16.0-25.4	25.8-38.4
Fibre (g)	2.6-3.6	1.0-1.5	1.0-1.5
Total sugars (g)		20.6	
Total minerals (g)	0.9	0.8-0.9	0.9-1.2
Calcium (mg)	30.0-73.2	20.0-37.0	50.0
Magnesium (mg)	NA*	27.0	54.0

Phosphorus (mg)	20.0-57.2	38.0-41.0	38.0-97.0
Potassium (mg)	287.0-323.0	191.0-407.0	246.0
Sodium (mg)	3.0-35.0	2.0-41.0	63.2
Iron (mg)	0.4-1.9	0.5-1.1	1.5
Vitamin A (IU)	30.0	175.0-540.0	10.0-17.0
Thiamine (mg)	0.05-0.15	0.03-0.09	0.25
Riboflavin (mg)	0.05-0.2	0.05-0.4	0.11-0.3
Vitamin C (mg)	12.0-14.0	7.0-10.0	11.0
Energy (kJ)	50-210	88-410	133-139

G) Geographical area of Production and Map as shown in page no:

The Jackfruit is predominantly cultivated in the taluks of Cuddalore, Panruti, Virudhachalam, Kurinchipadi in the Cuddalore district.

Coordinates: 11°46'N 79°33'E / 11.77°N 79.55°E / 11.77; 79.55

H) Proof of Origin (Historical records):

Panruti is a town of Cuddalore District in Tamil Nadu. Panruti came from 'pan' meaning 'song' and 'ruti' meaning 'music' in Tamil. It is believed that the Jackfruit of the Cuddalore district is famous for jackfruit cultivation with unique qualities. There are many books and inscriptions which depict the proof of cultivation and historical details.

1. **"Madras district gazetteer South Arcot"** a report titled "Gazetteer of South Arcot District" was written by Francis.W published by "Government of Madras" published in 1906. The book stated that the high red land of Panruti taluk traded the cashew and jackfruit enormously and economic value of the region.
2. According to the Maligampattu villagers that they pointed out a gigantic tree is 100 years old. It stands to prove the historic heritage tree of the village.
3. In the Rajyasabha debate session dated on 12th December 1991, discussed about a plan to implement an food processing plant in Panruti. It showed the economic advantage of the jackfruit and its processing in the Panruti region. It clearly stated that plenty of jackfruit grown in the area is to be preserved by the commencement of food processing unit.
4. **"Indian Capitalism in Development"** a book titled was written by Barbara Harriss-white and Judith Heyer published by "Routledge, New York, USA" published in 2015.

The report mentioned that Panruti is a big player in the cashew and jack fruit export business. The local non-farm labor market is thus highly dynamic and goes far beyond agriculture.

I) Method of Production:

Propagation and planting

Seed:

Jackfruit is commonly propagated by seeds. Seed should be sown immediately after extraction since they lose their viability during storage. Soaking seed in NAA (25 mg/L of water) for 24 hrs improve their germination and seedling growth. Jack is easily propagated through seeds. The seedlings take 8-10 years to bear fruits. Due to the highly cross-pollinated nature of the crop, vegetative propagation is essential in order to get true to type plants. Propagation is usually by seeds that can be kept no longer than a month before planting. Germination requires 3 to 8

weeks but is expedited by soaking seeds in water for 24 hours. Soaking the seeds in a 10% solution of gibberellic acid results in 100% germination. The seeds may be sown in situ or may be nursery-germinated and moved when no more than 4 leaves have appeared. A more advanced seedling, with its long and delicate tap root, is very difficult to transplant successfully. When propagated through seeds, jack exhibits a wide variation among its progenies.

Air layering:

It is one of the best methods to obtain a true type plant. Air layering of one-year-old shoot of bearing plant gives higher success when treated with IBA (500 ppm).

Epicotyls grafting:

Commercially inarching on 10 months old jack seedlings is done to produce vegetative progenies. The grafts come to bearing within 4½- 5 years when compared to seedlings which take 7-8 years normally.

Soaking one-month-old seedlings in a gibberellic acid solution (25– 200 ppm) enhances shoot growth. Gibberellic acid sprays and paste increase root growth. Softwood grafting (cleft method) on 2 months old seedlings with the scion of 3-4 months old also was found to be successful (70 -80%). Since the viability of seeds is very low, seeds have to be sown immediately after extraction to raise rootstocks. Pits of size 1 cubic meter are dug at a spacing of 6-8 m and filled with topsoil mixed with 10 kg FYM. The grafts are planted in the center of the pits during June-September. Proper staking is required to avoid lodging and subsequent breakage at the graft joint. Thatching or providing shade with coconut leaves and thorough mulching of basins after the cessation of monsoon season is essential to avoid mortality of grafts.

Seedlings are planted in a square system with spacing of 10m x10m. June to August is the ideal time for planting.

Manuring

Jack trees are trained to a single stem, early side branches should be removed so that a uniform smooth trunk develops for a height of 1.5 – 2 m and then side branches should be permitted to arise. The flower buds appear on the trunk which should be kept free of vegetative growth. The fertilizers are applied during the rainy season. If irrigation is available, they can be split into two doses and applied twice in a year i.e. during June –July, and September – October. The manures and fertilizers can be applied in a circular trench taken 50-60 cm away from the trunk.

Manure	1st year (Kg/plant)	Annual increase (Kg/plant)	5th year (Kg/plant)
FYM	10 kg	10 kg	50 kg
N	0.150	0.150	0.750
P	0.080	0.080	0.400
K	0.100	0.100	0.500

Irrigation

Though jack is cultivated under rainfed conditions, it is very sensitive to drought. Hence irrigation should be done depending on the type of soil, season, etc. so that, there should not be any moisture stress, especially during flowering and fruit set. Similarly, too much soil moisture will affect the quality of fruit. The carpels will develop an insipid taste when there is excess soil moisture.

Inter cultivation:

During the pre-bearing age, pulses can be raised as intercrop and dried leaves can be spread below the trees to serve as mulch for moisture conservation. As the trunk increases in size, the active buds of female inflorescence develop from the trunk as well as from main scaffold branches, this type of bearing habit is called 'cauliflorus'. These fruit buds should be protected from any possible damage by rubbing the body of stray cattle such as buffaloes through spreading dried thorny bushes. This is very essential especially when there is no proper fence in the fields.

Inflorescence:

Male inflorescence (catkin) shows protrusion of anthers on its spike surface. Between 8.30 and 9.30 in the morning, it sheds pollen. After a few days, it dries, turns black, and falls down. In Female inflorescence (catkin), stigma would be visible by 8 in the morning from the fourth day of its emerging out from the sheath. The pollination and fertilization are completed within 3- 6 days.

Harvesting

Normally jack starts producing fruits from the 7th – 8th year onwards. Grafted plants can start yield from the 4th to the 5th year itself. A tree attains its peak bearing stage in about 15-16 years of planting. At this stage, normally a tree bears up to 250 fruits annually with annual fluctuation in yield. The weight of fruits also varies depending on the type. On average, about 40-50 tons of fruits per hectare could be obtained. Fruits mature 3 to 8 months from flowering. Normally the fruits will be available from March to June. The period of fruit development is February to June. In higher elevation harvest extends up to September.

Even in plains, certain genotypes bear an off-season crop during October – December. The optimum stage of maturity (harvest) of jackfruit has been reported to be 90-110 days after the appearance of the spike. The yield ranges from 20 to 100 fruits/trees. The fruit weight varies from 10 to 30 kg.

On average, 50-80 tons of fruits can be harvested from a hectare of land. Harvesting is done by cutting off the fruit stalks carrying the fruits. By just looking at the fruit, an experienced farmer can quickly identify the maturity date of the fruit. The fruits are harvested at different stages of maturity depending on the intended use and market demand. When fruits are used as a vegetable or for preparing pickles, very immature fruits, where fruitlets (bulbs) or seeds are not yet fully formed, are harvested. They are rather dark green with stiff, hard, and closely spaced spines.

The testa (exocarp) of the seeds is not yet formed; hence there is no need of removing the testa while preparing them for use as vegetables. The seeds at this stage are still very tender and tasty. In the third stage, fully developed fruits and seeds are used for making various preparations like curries. A dull, hollow sound when the fruit is tapped is considered to be the most reliable indicator that the fruit is already mature. Harvesting at this stage permits the fruit to be used for making chips, various curries, etc. If ripe fruits are preferred, they can be also picked at the mature stage when they emit the jackfruit's characteristic aroma. Therefore, for fruits to be used for processing into chips, criteria for harvesting should be when the spines start to grow further apart, but not yet fully flattened and the skin color should be still green and the fruit produces a dull, hollow sound when tapped with hand.

Since individual trees will have fruits of different maturity levels, it is necessary to harvest the fruits at least weekly. About 60% of the whole jackfruit consists of inedible parts such as outer

prickly rind, inner perigones, and central core and only around 35% of the whole fruit consists of edible flesh.

Fruit should be harvested by cutting from the stalk using sharp-bladed equipment. If the fruit is high up in the tree, a sack should be tied around the fruit with a rope, the stalk should be cut, and the fruit should be gently lowered to the ground. It is always best to harvest and handle fruits with care to prevent mechanical injuries that hasten fruit deterioration. During bulk harvesting, sacks filled with rice straw are used to drop the fruits from the tree without damage. While harvesting, the person on the ground will keep on moving the sacks around the tree, while the person on the tree will drop the fruits on the sacks. Alternatively, a person on the ground will be ready with a second sack full of straw so that in case the aim is not good, he will throw the sack on the spot where the fruit is falling.

J) Uniqueness:

Panruti Jackfruit, grown in the Panruti region of Tamil Nadu, is highly regarded for its unique characteristics, making it one of the best varieties of jackfruit in India. Below are the key characteristics of Panruti Jackfruit:

1. **Size and Shape:**
Large Size: The Panruti jackfruit is known for its large size, with some fruits reaching up to 50 kg, though smaller sizes are also common.
Oblong or Oval Shape: The fruit typically has a distinctive oblong or oval shape, which is consistent with the large size.
2. **Skin and Color:**
Green, Rigid Skin When Unripe: The unripe jackfruit has a green, spiny skin, which softens as the fruit ripens.
Yellowish to Brown When Ripe: As the fruit ripens, its skin changes color, becoming brownish and yellowish, and becomes slightly smoother.
3. **Sweetness and Flavor:**
Sweet, Mild Flavor: The flesh of the ripened Panruti jackfruit is exceptionally sweet with a subtle acidic tang. Its flavor is less intense and more balanced compared to other varieties, making it appealing to many.
Aromatic: The ripe fruit has a fragrant aroma that is distinctive and inviting.
4. **Pulp and Texture:**
Mildly Fibrous Pulp: The edible part of the fruit, the pulp, surrounds the seeds and is tender but fibrous. The texture is soft and juicy when ripe, and the pulp has a unique melt-in-the-mouth quality.
Non-sticky: Unlike some other jackfruit varieties, the pulp of Panruti jackfruit is relatively non-sticky, which makes it easier to handle.
5. **Seed Characteristics:**
Large, Flat Seeds: The seeds of the Panruti jackfruit are large and flat, typically surrounded by thick pulp.
Edible Seeds: The seeds are often consumed after being boiled or roasted, offering a nutty flavor. They are rich in starch and protein.
6. **Ripening Season:**

Late Ripening: While the flowering begins around November, the fruit typically ripens from June to August. However, the late varieties of Panruti jackfruit may ripen even later, as late as October.

Availability: Fresh tender jackfruit is generally available from March through August, but it's not available from November onwards due to the off-season.

7. **Commercial and Export Quality:**

High-Quality Fruit: Panruti jackfruit is known for its exceptional quality, which makes it a preferred choice for both domestic consumption and export markets.

Exported Worldwide: Due to its sweet and mild flavor, it is widely exported to various countries, contributing significantly to the local economy.

8. **Traditional Varieties vs. Improved Varieties:**

Traditional Varieties: These are known for their seasonal growth and bearing fruit once a year.

Improved Varieties: The Tamil Nadu Agricultural University (TNAU) has developed varieties like Palur-1 and PPI Jack, which offer better performance in terms of yield and fruit quality.

9. **Culinary Use:**

Ripe Fruit: The ripe fruit is typically eaten fresh, or it can be used in desserts, jams, and smoothies due to its sweet, juicy pulp.

Unripe Fruit: The unripe jackfruit is used as a vegetable in curries, chips, and other savory dishes.

The Panruti Jackfruit stands out for its size, flavor, and texture, making it an integral part of the local culture and economy in Tamil Nadu.

Geographical Variation and Quality of Panruti Jackfruit:

A study that assessed seventy jackfruit accessions from seven prominent regions of India revealed significant variations in physico-chemical characteristics based on geographical location. The study applied Principal Component Analysis (PCA) and Linear Discriminant Analysis (LDA) to identify the relationship between fruit quality and its origin.

PCA Results: Panruti accessions stood out due to their high Total Soluble Solids (TSS), total sugar content, fruit length, and fruit weight. They also showed moderate values for flake number, flake weight, pulp weight, seed weight, and fruit width compared to other regions like Varkala, Nadia, and Khowai.

LDA Results: The accessions from Panruti could be distinguished with a 95% confidence level based on their physicochemical characteristics. Notably, even though Varkala is geographically closer to Panruti, its jackfruit accessions showed a closer relationship with those from Nadia and Khowai, suggesting a possible introduction of jackfruit between regions and subsequent diversification.

This analysis confirms that Panruti jackfruit can be easily distinguished from other varieties based on these characteristics, which has potential commercial applications for sourcing and certification of Panruti's unique jackfruit.

Improved Varieties of Panruti Jackfruit:

The Panruti jackfruit has given rise to improved varieties that enhance the region's agricultural profile:

PLR-1: Developed in 1992 by the Tamil Nadu Agricultural University (TNAU), PLR-1 is a clonal selection from the Panikkankuppam local in Panruti. This variety is high yielding, with medium height and a more compact growth habit, making it suitable for high-density planting. It is notable for bearing fruit not only during the regular season (March-June) but also during the off-season (October-December).

PLR-2: Developed in 2007, PLR-2 is a clonal selection from the Pathirakottai local of Panruti. This variety is known for its high-quality, large-sized fruits, and highly palatable edible flakes. It also exhibits resilience to pest and insect diseases, making it an attractive option for cultivation.

Monoculture Plantations in Panruti:

In Panruti, monoculture jackfruit plantations are a common sight. Farmers often cultivate jackfruit in orchards ranging in size from one acre to twenty acres. This practice of monoculture ensures a steady supply of jackfruit for both local markets and export.

Record-Sized Jackfruits:

Panruti is famous for producing extra-large jackfruits, with one recently harvested fruit weighing an astonishing 81 kg. While this fruit has not yet been officially recognized by the Guinness Book of Records, it remains one of the largest jackfruits ever recorded.

Thinning Practice:

A unique agronomy practice in Panruti is thinning, which is not commonly followed in other regions. This technique involves cutting off excess tender fruits to allow only selected ones to grow. The thinning formula retains two fruits per age of the tree, ensuring that only average-sized or large fruits reach the market. As a result, fruits smaller than 15 kg are not seen in the market, contributing to the high quality and size of Panruti jackfruit.

Irrigation and Its Effects on Jackfruit:

Irrigation plays a significant role in increasing jackfruit productivity in Panruti, boosting yields by up to 50%. However, while irrigation boosts productivity, it has a slight downside: it can dilute the taste of the fruit. Rain-fed trees tend to produce sweeter jackfruit, as even 50 mm of rainfall can affect the sucrose levels in the fruit. This phenomenon highlights the importance of natural rainfall for enhancing the flavor and sweetness of Panruti jackfruit.

The Panruti jackfruit stands out not only due to its high-quality fruit and large size but also because of the region's innovative agricultural practices and the development of improved varieties. The combination of unique morphological characteristics, thinning practices, and irrigation techniques makes Panruti a hub for top-tier jackfruit production in India.

K) Inspection Body:

In the future, the inspection body will be formed which may be constituted by the below-mentioned persons to keep the check upon the quality of the products.

- District Collector, Cuddalore, Head of the Inspection Body
- Chief Executive Officer, TANSAMB, Chennai
- Deputy Director (Agribusiness), Cuddalore
- One member from the Applicant (I)
- District Development Manager, NABARD, Madurai
- CEO, NABARD Madurai Agribusiness Incubation Forum, Madurai
- One member from Horticulture Department, Cuddalore.

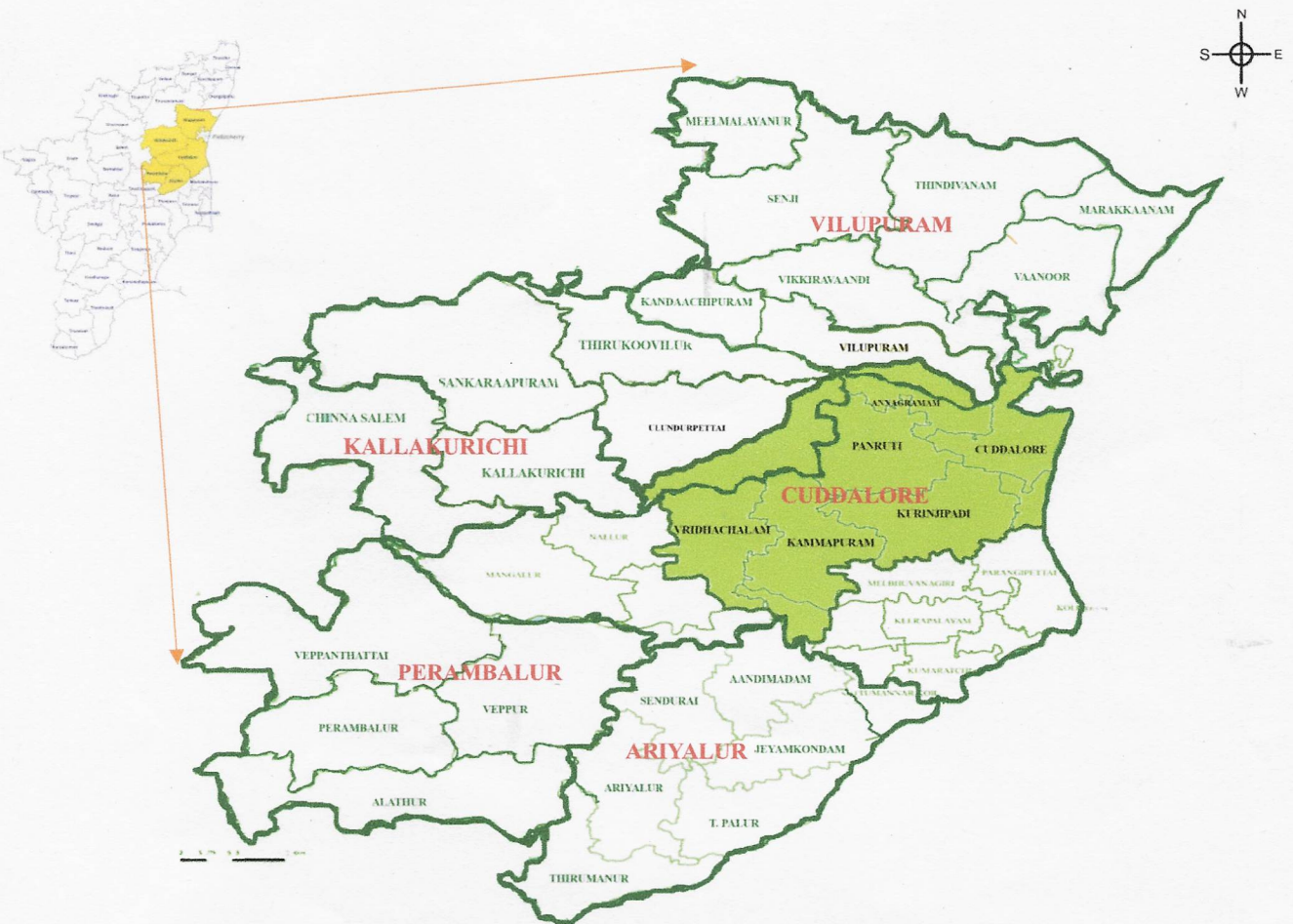
- One member from Sulashana Panneer Selvam, IPR for Agriculture and Rural Development Centre (NGO)

This inspection body formed by the applicant will be acting independently to ensure the quality check upon the goods and the applicant also undertakes that the inspection body will keep the check on the quality, manufacturing, and mechanism of the goods. The abovementioned persons may constitute the inspection body.

L) Others:


PANRUTI PALAAPALAM (JACKFRUIT) CULTIVATION AREA

INDIA>TAMILNADU> CUDDALORE



Latitude: 11° 24' 41"N to 11° 50' 16"N

Longitude: 79° 05' 06"E to 79° 47' 41"E

 - Panruti Jackfruit Cultivation Area

S. Vignesh

[Signature]

H. D. [Signature]
PROFESSOR & HEAD
DEPT OF AGRL. ENGINEERING
AGRL. COLLEGE & RESEARCH INSTITUTE
MADURAI - 625 104

G.I. APPLICATION NUMBER – 837

Application Date: 18-02-2022

Application is made by 1. Tamil Nadu State Agricultural Marketing Board at Chief Executive Officer, Thiru Vi Ka Industrial Estate, Guindy, Chennai - 600 032, Tamil Nadu, India and 2. Tamil Nadu Cashew Processors and Exporters Association at No. 164/65, Kumbakonam Road, Panruti, District: Cuddalore – 607 106, Tamil Nadu, India for Registration in Part - A of the Register of **Panruti Cashew** under Application No. 837 in respect of Cashew falling in Class – 31 is hereby advertised as accepted under Sub-section (1) of Section 13 of Geographical Indications of Goods (Registration and Protection) Act, 1999.

- A) Name of the Applicant :** 1. Tamil Nadu State Agricultural Marketing Board
2. Tamil Nadu Cashew Processors and Exporters Association,
- B) Address :** 1. Tamil Nadu State Agricultural Marketing Board at Chief Executive Officer, Thiru Vi Ka Industrial Estate, Guindy, Chennai - 600 032, Tamil Nadu, India
2. Tamil Nadu Cashew Processors and Exporters Association at No. 164/65, Kumbakonam Road, Panruti, District: Cuddalore – 607 106, Tamil Nadu, India

Facilitated By:

NABARD Madurai Agri Business Incubation Forum, Madurai

- C) Name of the Geographical Indication :**

PANRUTI CASHEW



- D) Types of Goods :** **Class 31 – Cashew**

E) Specification:

Panruti cashew, cultivated in the Panruti region of Tamil Nadu, is a highly prized variety known for its exceptional quality and unique characteristics. The cashews from this region are especially noted for their sweet, slightly nutty flavor, combined with a crisp yet tender texture. These distinctive qualities set Panruti cashews apart from other varieties, making them highly sought after in both domestic and international markets.

The region's tropical climate and well-drained sandy loam or red soils create an ideal environment for cashew cultivation. These favorable conditions, along with the traditional processing methods employed, help maintain the nuts' freshness and enhance their quality. The cashew tree in Panruti typically yields medium-sized, well-formed nuts, which contribute to the overall high standard of the crop. The unique cashew formation, where the curved nut is nestled under the cashew apple, also adds to the appeal of this variety.

The morphological characteristics of Panruti cashew refer to the physical features and structural attributes of the cashew tree and its fruit. These characteristics play a key role in the overall quality and distinctiveness of Panruti cashew nuts. Below are the key morphological features:

1. Cashew Tree:

Height: The Panruti cashew tree can grow up to 14 meters in height. However, dwarf cultivars, which are preferred for commercial cultivation, typically grow up to 6 meters.

Branches: The tree has a spreading, dense canopy with branches that extend widely, helping to capture sunlight efficiently for optimal nut production.

Leaves: The cashew tree has long, leathery leaves that are dark green in color, providing shade and protection for the cashew nuts. These leaves are ovate to elliptic in shape with prominent venation.

2. Cashew Fruit (Cashew Apple):

The cashew apple is the enlarged stem of the plant, rather than a true fruit. It is fleshy, pear-shaped, and typically has a yellow, red, or orange color. The cashew apple is a key part of the cashew tree's morphology and is used in various culinary products, but it is the cashew nut that is most commercially valuable.

Size: The cashew apple can vary in size but is generally small to medium-sized, depending on the cultivar.

Shape: The cashew apple is curved or pear-shaped with a thick skin that can be either yellow or red, turning to a more golden hue as it ripens.

3. Cashew Nut:

Shape: The Panruti cashew nut is distinctively curved and typically medium-sized. The nut has a characteristic C-shape that makes it recognizable and sets it apart from other varieties.

Size: The nuts are medium to large in size, making them ideal for high-quality production. Well-formed and uniform nuts are a hallmark of the Panruti variety.

Kernel: The cashew kernel inside the shell is typically white, meaty, and soft in its raw form. It is known for being rich in flavor and texture.

Color: When roasted, the cashew kernel turns golden with a slightly crisp texture, adding to its appeal.

4. Cashew Shell:

Outer Shell: The cashew nut is protected by a thick, hard outer shell which acts as a natural defense mechanism. This shell is tough, making the nut resistant to damage during harvesting and transportation.

Testa Membrane: Underneath the hard shell is the testa membrane, which is a protective layer that shields the kernel.

5. Flowers:

The flowers of the cashew tree are small, white to pinkish, and grow in clusters at the end of the branches. These flowers have both male and female reproductive organs, enabling pollination and nut production.

Flowering Time: Cashew trees in Panruti typically bloom in the dry season, contributing to a more predictable harvest.

6. Root System:

The cashew tree has a strong and deep root system that helps it thrive in sandy loam or red soils. The roots also help the tree withstand dry periods, making it well-suited for the tropical climate of the Panruti region.

The morphological characteristics of Panruti cashew, including its tree structure, fruit shape, nut size, and protective layers, play an important role in the quality of the cashews produced. These features contribute to the cashew's distinct flavor, texture, and size, making it a highly valued variety in both domestic and international markets.

F) Description:

Linkage to specific geographical location: It is best produced at low altitudes near the seacoast, meaning that the Cuddalore district is among the best place to do due to its humid climate and fertile soil.

Special characteristics:

Tamil Nadu is the six largest producer state of cashew nut in India. **Cuddalore district ranked first in terms of cashew production with 24,302 tonnes (47.0 per cent) and had the highest cashew productivity of 810 kg / ha among cashew growing districts in the state (Loganathan and Chandrasekaran, 2013).** the Cuddalore District of Tamil Nadu was chosen as it is labeled as Cashew Capital, out of Seven taluks of this district, Panruti- the Cashew Bowl of Tamil Nadu, which annually has a processing capacity of 1,50,000 tonnes with a turnover of about Rs.2000 Crores. Out of the 1, 42,000 hectares under cashew cultivation in the state, Panruti accounts for about 35,000 hectares. There are around 32 Export Oriented Cashew Production Units in this area besides 250 processing units and over 500 cottage industrie. The Panruti cashew size is slightly small, gives a very nutty flavour and has unique value in the market, both domestically and internationally. Additionally, the cashew processing practices and units in Panruti are special and unique because this variety of cashew largely derives its signature taste due to the processing methods followed by the Panruti cashew processing units. The Indian cashew kernel is well acclaimed for its good quality, taste and appearance. Sometimes cashew nuts are called “**nature's vitamin pill**,”

It is a short, stocky, low-spreading, evergreen tropical tree. It flowers once a year, between the months of November and January. The fruit ripens fully within 2 months. Cashews are easily recognizable. The seeds are rich in oil and distinctively flavored, commonly used in popular dishes made in South India. It is best produced at low altitudes near the seacoast, meaning that the Cuddalore district is among the best place to do due to its humid climate and fertile soil. The leathery leaves are spirally arranged and elliptical in shape. The curved fruit, which is not a true nut, is shaped like a large thick bean and can reach more than 2.5 cm (1 inch) long. It appears as though one of its ends has been forcibly sunk into a pear-shaped swollen stem (hypo-carp), called the cashew apple. The cashew apples are picked by hand, and the curved fruits are first detached and then sun-dried.

Most cashew trees start bearing fruit in the third or fourth year and are likely to reach their mature yield by the seventh year if conditions are favorable. The average yield of nuts of a

mature tree is in the range of 7 to 11 kg per annum. Although the cashew tree is capable of living for 50 to 60 years, most trees produce nuts for about 15 to 20 years.

Characteristics	Details
Canopy type	Compact
Branching habit	Intensive
Flowering	Jan – Feb
Fruiting	Feb – March
Special Character	Early flowering
Apple color	Red
Juice %	72.8
Nut weight	7.18g
No. of nuts/kg	140
Kernel weight	2.16 g
Shelling %	29.1
Export grade	W210
Mean nut yield per tree	11.68 kg
Varieties released by the TNAU	Vridhachalam-1, Vridhachalam-2, Vridhachalam-3, VRI 4, VRI (CW) H1

Mineral composition of Panruti cashew nut kernel

Mineral	composition (mg/100g)
Magnesium (Mg)	19.3±0.1
Calcium (Ca)	21.5±0.0
Sodium (Na)	8.2±0.2
Zinc(Zn)	0.8±0.1
Iron(Fe)	0.6±0.1
Potassium(K)	27.5±0.4
Phosphorus(P)	14.0±0.2

Values are means ± standard deviation of triplicate determinations

G) Geographical area of Production and Map as shown in page no:

The cashew cultivation and processing units are mainly covered in the around 376 villages of the taluks of Cuddalore, Panruti, Virudhachalam, Kurinchipadi in the Cuddalore district.

H) Proof of Origin (Historical records):

Panruti is a town of Cuddalore District in Tamil Nadu. Panruti came from *pan* meaning *song* and *ruti* meaning *music* in Tamil. It is believed that the cashew of the Cuddalore district is famous for cashew processing with unique qualities. There are many books and inscriptions which depict the proof of cultivation and historical details.

The cashew tree (*Anacardium occidentale*) is believed to be a native of South America and is now met with in many other tropical and sub-tropical parts of the world including India, Ceylon, Inge-China, Malay Peninsula; Philippine Islands, Brazil, and Africa. It thrives under varying soil and climatic conditions. In India it grows on laterite soils on the West Coast with an annual rainfall of 120 to 150 inches and does equally well on the sandy soils of the East Coast having rainfall of only about 35 inches. It is one of the hardiest of drought resisting plants, although it cannot withstand frost. Cashew trees flourish fairly well even on poor soils, and a large number of them grow wild.

1. ***"The Report on the Marketing of Cashew Nuts"*** a report titled "Agricultural Marketing in India" published by "Central Agricultural Marketing Department, Government of India" published in 1944.

The publication which presents in a concise form an account of the production and marketing of cashew nuts, cashew kernels, and the various by-products of the cashew industry in India especially highlights the Panruti cashew cultivation, points out a number of ways in which producers returns can be increased. It also contains suggestions for improving the quality of the products and methods of processing as well as for better utilization of the various by-products of the industry.

The reports covered the cashew cultivation and processing details in the name of "South Arcot" (South Arcot was a district in the Madras Presidency of British India. It covered the area of the present-day districts of Cuddalore, Kallakurichi and Viluppuram in the Indian state of Tamil Nadu.)

2. A book titled ***"Fruits of India – Tropical and Subtropical"*** published by Naya Prakash edited by T.K Bose, Dept of Horticuture, Bidhan Chandra Krishi Viswavidhyalaya, Kalyani – 741235 published in "Central Agricultural Marketing Department, Government of India" published in 1988.

The book covered the various cultivation and processing practices of Jack Fruit in the three major states of the India. It also highlighted the unique cashew processing practices followed by the Tamil Nadu, Kerala and Karnataka. The taste of the Panruti cashew majorly derived from the unique processing method followed by the Panruti cashew processing units.

I) Method of Production:

Panruti nuts yield about 24 kilograms of kernels. Another crucial fact to note is that cashew processing is a major activity in many Panruti villages. Because of their better quality, raw nuts from Panruti fetch slightly more than the market price. Raw nuts are sold in small quantities to the local processors and peddlers. Bulk quantities are sold to the export houses in Panruti. Large plantation owners retain their stock for sale during the off-season for a higher price. The system of advance payments by traders to the growers is not very common in Panruti region. In Panruti, there are hundreds of small processing units, organised and owned by villagers which are part of an extensive network linked to a small number of large export houses. This cluster arrangement merits further study since it seems to generate considerable employment and a greater spread of benefits than other patterns.

Cultivation

Fast growing, drought-resistant and easy grow under cultivation by direct seeding of germinated seeds – seedlings do not transplant readily. Well-drained friable soils at low altitudes recommended frost-free with an annual rainfall of 1 000-3 000 mm, preferably with a pronounced dry season of 3-4.

Cashews can also be grown satisfactorily in semi-arid areas but can show erratic production as a result of relative variations Trees with a productive life span of 30-40 years, normally bearing in fruit in third or fourth year under favourable conditions, attaining maximum production in 7 years.

Harvesting

Fruits harvested when fully ripe, the nuts are collected after falling to the ground. In dry weather they can be left on the ground until the apple dries but should be collected daily in wet weather. The nuts are then removed from the apples and dried.

Post-harvest treatments

After drying and roasting the kernels are separated from the shells and graded. Care must be taken when shelling to avoid the caustic juice that squirts out on roasting. Shelling is usually done manually, using cheap labour in India, elsewhere mechanical processing has been introduced. Stored in vacuum packed, hermetically sealed tins where cashews remain stable at room temperatures; under refrigeration a shelf life of one. Production and consumption/utilization Approximately 60% of cashew kernels are marketed as salted nuts; they are also used in confectionery and bakery products. Un-shelled, un-roasted cashew nuts should not be eaten.

Soil:

Panruti nuts yield about 24 kilograms of kernels. Another crucial fact to note is that cashew processing is a major activity in many Panruti villages. Cashew can be cultivated in a wide variety of soils. In India, even now cashew is a crop of marginal lands. It can survive even in wastelands of low fertility and can be grown in almost all soil types from the sandy sea coast to laterite hill slopes. But the best soils are deep, friable, well-drained sandy laminas without a hardpan. It cannot withstand water stagnation, flooding, or bad drainage. In Tamil Nadu, cashew is mainly grown in laterite, red, and coastal sands.

Climate:

Cashew is mainly a crop of the tropics. Its distribution extends in the region of Cuddalore, Tamil Nadu. It can tolerate a wide range of soil and climatic conditions and the major limiting factor is its inability to tolerate frost and extreme cold for a long time. Its distribution is restricted to altitudes below 700 m where the temperature does not fall below 20°C for prolonged periods. It requires a minimum rainfall of 50 cm per annum but can withstand from 30 to 400 cm. If there is sufficient water supply, it can withstand long periods of low relative humidity also. Cashew is a sun-loving tree and does not tolerate excessive shade. Very high temperatures (39-42 °C), however, during the marble stage of fruit development cause fruit drop. Heavy rains and cloudy weather adversely affect the yield of cashew.

VARIETIES

1. VRI 1 (1981)

It is a clonal selection from germplasm accession maintained at Regional Research Station, Virdhachalam.

General character:

- Canopy type : compact
- Branching Habit: Intensive
- Special Character: Compact canopy, Wide adaptability
- Apple Colour: Yellow

Particulars	Special Characters
Average annual yield	7.12 kg per tree in a year.

Yield	1700 kg nuts/kg
Nut weight	5g
Shelling percent	20 %
Fruits /panicle	5 to 7
Juice	82%
Character	It is an intensive branching type. The kernels are of high quality (240 W. counts).

2. VRI 2 (1985)

Canopy type : compact

Branching Habit: Intensive

Particulars	Special Characters
Yield	1750 kg of nuts/ha
Nut weight	5g
Shelling percentage	28%
Fruits /panicle	5-8
Character	Exhibits less variation on seed propagation. The nuts contain 32.5% protein, 10.3% sugars, 28.7% starch and 47% fat. It is resistant to tea mosquito bug and drought. Single tree yield is about 8 kg per year.

3. VRI 3 (1991)

Seedling progeny

Particulars	Special Characters
Yield	The increase in yield was 53.57% and 81.92% over VRI 1 and VRI 2 respectively. The tree is medium-sized with a height of 5m.
Character	It is a seedling progeny (M 26-2) of a high yielding tree (No. 1602) selected from a village Edayanchavadi of Vanur Block of South Arcot District recording a mean yield of 14.19 kg per tree per year as against 9.24 kg and 7.80 kg by VRI 1 and VRI 2
Shelling percent	29.1
Maturity Indices	At pea stage the apple is pinkish green and turns to pink at maturity

4. VRI 4 (2000)

It is a selection from Vazhisodanipalayam of Cuddalore taluk of Tamil Nadu released from Regional Research Station, Virudhachalam. The crop yields 3320 kg of nuts per hectare. The nuts are medium in size, each weighing on an average of 6.63 g. Each tree yields as high as 18.10 kg of nuts against 1.84 and 7.92 kg/tree by VRI 3 and VRI 2 respectively. The nuts have a shelling percentage of 28.5. The flowers appear during January – May and crop matures during April – June.

5. VRI (CW) H1(2009)

- Cluster bearing (6-10 fruits/panicle)
- Bold nuts (7.2 g) and kernel (2.2 g)
- High shelling (30.5%)
- Suitable for export (W 210 grade)
- Easy peeling testa
- Yield - 14.5 kg/tree, 2900 kg/ha

PROCESSING

Processing of cashew nuts is the recovery of the kernel from raw nuts by manual or mechanical means. Processing consists of moisture conditioning, roasting, shelling, drying, peeling, grading and packaging. Conditioning involves the sprinkling of water on dried nuts to bring to an optimum moisture level of 15-25 percent.

In drum roasting, the rate of shelling and the out-turn of wholes are high. The main disadvantage of this method is the loss of Cashew Nut Shell liquid.

In oil bath roasting, the shell gets heated and cell walls get separated releasing oil into the bath. The oil is recovered by a continuous overflow arrangement. The technique followed in different factories varies to some extent with regard to temperature and time of roasting. Shelling is usually done manually except in some units where hand and leg-operated shelling machines are used. The kernel is scooped out by means of a sharp needle. After shelling, the kernel, is dried to reduce the moisture and to loosen the adhering testa. The most commonly used driers are the Broma driers. After drying for about 6-12 hours, the peeling is done by hand. The next stage is the grading of kernels on the basis of specification for exportable grades. The wholes are size-graded on the basis of the number of kernels per kg. Packing is usually done in 10 kg capacity tins which are subsequently evacuated and filled with carbon dioxide. In order to overcome the possible over-drying, a dehumidification step is introduced before packing. However, manual operation as done in India gives a considerably higher yield (90-95%) of wholes as compared to mechanical processing.

Quality and Grading

Cashew kernels are classified as:

First Quality Fancy cashew kernels have a uniform color which may be white, light yellow, or pale ivory.

Second Quality Scorched cashew kernels may be yellow, light brown, light ivory, light ash-grey or deep ivory.

Third Quality Special Scorched cashew kernels may be deep yellow, brown, amber, and light to deep blue. They may be slightly shrivelled, immature, light-brown speckled, blemished or otherwise discoloured.

Fourth Quality cashew kernels would qualify as First or Second Quality, except that they have pitted spots.

Lightly Blemished Wholes (LBW) cashew kernels may be light brown, light ivory, light ash-grey, or deep ivory. Kernels may show light brown speckles or blemishes on the surface, provided that not more than 40 percent of the kernels are affected.

Lightly Blemished Pieces (LP) cashew pieces may be light brown, light ivory, light ash-grey, or deep ivory. Pieces may show light brown speckles or blemishes on the surface, provided that not more than 20 percent of the pieces are affected.

Blemished Wholes (BW) cashew kernels may be deep yellow, brown, amber, or light to deep blue. Kernels may be slightly shrivelled, immature, or maybe brown speckled or blemished on the surface, provided that not more than 60 percent of the kernels are affected.

DESSERT cashew kernels may be scraped, deeply scorched, shrivelled, deep-brown-speckled, black-speckled, blemished, or otherwise discoloured.

Sizing

Sizing is compulsory in first quality/fancy cashew kernels but is optional for other whole grades.

Size Tolerance: Whole kernels of a lower size grade shall not exceed 10% by weight.

The number of broken kernels or pieces in whole kernels shall not exceed 10% by weight.

The number of pieces present in butts and splits shall not exceed 10% by weight.

The quantity of the next lower size grade in pieces shall not exceed 5% by weight.

Size designation	Kg	
180 SLW	266 – 395	'King of Cashew ' - They are larger in size and very expensive
210 SLW	395 – 465	are popularly known as ' Jumbo ' nuts.
240 SLW	485 – 530	An attractive grade that is reasonably priced
320 SLW	660 -706	Most popular among cashew kernels and highest in terms of availability, worldwide
450 SLW	880 - 990	Smallest and cheapest white whole kernels and hence the favourite among less priced whole grades.

Whole (W)

A cashew kernel is classified as a whole if it has the characteristic shape of a cashew kernel and not more than 1/8th of the kernel has been broken off. This grade may also be designated as W. An excessive number of 7/8th kernels or splits that detract from the appearance of the sampled lot may be the basis for the claim.

Butts (B)

Kernels that have been broken crosswise are less than 7/8 but not less than 3/8 of a whole kernel, and the cotyledons are still naturally attached. This grade may also be designated as B.

Splits (S)

One half of a cashew kernel that has been split lengthwise provided not more than 1/8 of this cotyledon has been broken off. This grade may also be designated as S.

J) Uniqueness:

The uniqueness of Panruti cashew lies in several distinctive features that set it apart from other cashew varieties, both in terms of cultivation and quality. Here are the key aspects that contribute to the uniqueness of Panruti cashew:

1. Flavor and Texture:

Rich Flavor: Panruti cashews are known for their slightly nutty and sweet flavor, which is more pronounced compared to many other cashew varieties. This delicate balance of taste makes them particularly sought after by consumers.

Texture: The nuts have a crisp yet tender texture, giving them an appealing mouthfeel. They are neither too hard nor too soft, offering the perfect bite.

2. Size and Shape of the Nut:

Panruti cashews are typically medium-sized and well-formed with a distinctive curved shape that is characteristic of this variety. This shape, often resembling the letter "C", is a key identifying feature of the nuts from this region.

The nuts are uniform in size, contributing to their high visual appeal and desirability in markets, especially in premium segments.

3. Superior Quality:

The raw cashew kernels are soft, white, and meaty, offering a premium product. After roasting, they turn a golden color and develop a crisp texture, enhancing the flavor.

The region's traditional processing methods, which focus on maintaining freshness and minimizing handling damage, contribute to the high quality of Panruti cashews. The shells and kernels are processed with care to preserve the delicate flavor and texture.

4. Ideal Growing Conditions:

Panruti cashews are grown in the tropical climate of Tamil Nadu, where the combination of sandy loam or red soils and consistent rainfall creates an ideal environment for cultivation. These conditions result in superior cashew nuts that are rich in flavor and texture.

The trees thrive in well-drained soils with moderate rainfall, which helps produce uniform and healthy crops year after year.

5. High Economic Value:

Panruti Cashew, often referred to as the 'goldmine' of Cuddalore, has a high demand in both domestic and international markets, making it one of the most valuable cashew varieties. Its distinct characteristics allow it to command a premium price, contributing significantly to the local economy.

The region supports over 32 export-oriented cashew production units, along with more than 500 cottage industries, all of which help process and package these high-quality nuts for global markets.

6. Export Orientation:

Panruti cashew is a highly export-oriented product, with significant exports going to countries around the world. Its superior quality, combined with the traditional processing methods used in the region, has established its reputation internationally.

7. Traditional Cultivation and Processing Methods:

The success of Panruti cashew can be attributed to the traditional and time-tested cultivation techniques employed by local farmers. These methods, passed down through generations, emphasize the careful handling of trees, harvesting, and processing to maintain the nuts' best qualities. Additionally, the processing techniques, including roasting and seasoning, are meticulously followed to enhance flavor, aroma, and texture.

8. Dwarf Cultivars:

While cashew trees can grow up to 14 meters, Panruti farmers prefer to grow dwarf cultivars that only reach about 6 meters in height. These smaller trees have a faster maturation rate, which leads to larger yields and a more profitable harvest, making them more desirable for commercial cultivation.

9. Protection by Natural Shell:

The thick outer shell of the cashew nut protects it from environmental damage, ensuring that it remains intact and high-quality from harvest to processing. The protective shell also contributes to the longer shelf life of the nuts.

The uniqueness of Panruti cashew is a combination of its distinctive flavor, superior texture, and the favorable growing conditions of the Panruti region. Its well-formed, medium-sized nuts, combined with traditional farming and processing techniques, make it a highly valued cashew variety that stands out in both domestic and international markets. This makes Panruti cashew not only an agricultural treasure for the region but also a symbol of high-quality, premium nuts.

1. Cuddalore district situated at low altitudes near the seacoast, best place to grow cashew due to its humid climate and fertile soil. The lateralized Cuddalore sandstone pediment areas are thickly capped with cashew trees as iron-rich soil supports that vegetation to a great extent.
2. Cuddalore receives about 1050 mm average annual rainfall and temperature ranges in maximum at 30-40 degrees and minimum at 18-24 degrees. The nearest seacoast is within 60km. The factors seem to be the important phenomena for the unique quality of the cashew apple.
3. The Panruti cashew size is slightly small, gives a nutty flavor, and has a unique value in the market.
4. "*Fruits of India – Tropical and Subtropical- 1988*" highlighted the unique cashew processing practices followed. The taste of the Panruti cashew is majorly derived from the unique processing method followed by the Panruti cashew processing units.
5. The mid-season flowering cultivars from Cuddalore are also visibly distinctive; The apple is round-shaped and thick red in colour. The average fruit weight was 42.80 g. The nuts are medium size with an average nut weight of 6.63 g and kernel weight of 1.7 g. The shelling percentage was 28.5 with a grade W 320 kernel count.
6. The international studies revealed that the selection of six cashews from the different parts of India, among these, Panruti showed significant results in high raw protein content of 23.0g/100g, even though having a lesser amount of water content i.e. 2.3 g/100g.
7. The Panruti cashew apple has a high amount of sucrose content among the other growing cashew apple in India and also Total dietary fibre showed significant results.
8. Cashew Nut Shell Liquid (CNSL) is a versatile by-product of the cashew industry. The nut has a shell of about 1/8-inch thickness inside which is a soft honeycomb structure containing a dark reddish brown viscous liquid. It is called cashew nut shell liquid, which is the pericarp fluid of the cashew nut. C.N.S.L. has innumerable applications in polymer-based industries such as friction linings, paints, and varnishes, laminating resins, rubber compounding resins, etc.,
9. The Small Industries Service Institute, MSME, Chennai report stated that a raw cashew nutshell contains over 20% CNSL on average but the research revealed the extraction percentage from the Panruti yielded CNSL having the range between 18.8 -22.6 %.

K) Inspection Body:

In the future, the inspection body will be formed which may be constituted by the below-mentioned persons to keep the check upon the quality of the products.

- District Collector, Cuddalore, Head of the Inspection Body
- Chief Executive Officer, TANSAMB, Chennai
- Deputy Director (Agribusiness), Cuddalore
- One member from the Applicant (I)

- District Development Manager, NABARD, Madurai
- CEO, NABARD Madurai Agribusiness Incubation Forum, Madurai
- One member from Horticulture Department, Cuddalore
- One member from Sulashana Panneer Selvam, IPR for Agriculture and Rural Development Centre (NGO)

This inspection body formed by the applicant will be acting independently to ensure the quality check upon the goods and the applicant also undertakes that the inspection body will keep the check on the quality, manufacturing, and mechanism of the goods. The abovementioned persons may constitute the inspection body.

L) Others:

In Tamil Nadu, Panruti is a major center for cashew production, with about 35,000 hectares of land dedicated to its cultivation. The region is home to numerous processing units, export-oriented production facilities, and cottage industries, all of which support the cashew trade. As one of the leading producers in India, Tamil Nadu plays a significant role in the global cashew industry.

Raw Panruti cashews are soft and white, while roasting transforms them into a golden, crisp version, enhancing their flavor. Salted varieties are particularly popular due to their delicious taste. Additionally, the cashew tree itself grows up to 14 meters, although dwarf cultivars, which grow to about 6 meters, are preferred for their faster maturation and higher yields.

In terms of overall cashew production, Tamil Nadu contributes significantly to India's output, with the state covering 91,058 hectares and producing nearly 58,000 tonnes of cashews in the 2017-18 period. The Panruti variety remains a cornerstone of this industry, often referred to as the 'goldmine' of Cuddalore, due to its high demand and economic value.

The Cashew Export Promotion Council of India (CEPC) was established by the Government of India in the year 1955, with the active cooperation of the cashew industry with the object of promoting exports of cashew kernels and cashew nut shell liquid from India. India has been exporting cashew kernels since the early part of the 20th century. Export earnings have been on the increase since 1985. Between 1980 and 1985, although export earnings increased, the quantity of cashew kernels exported decreased. Since 1985, there is a steady growth in the quantity of cashew kernels export market.

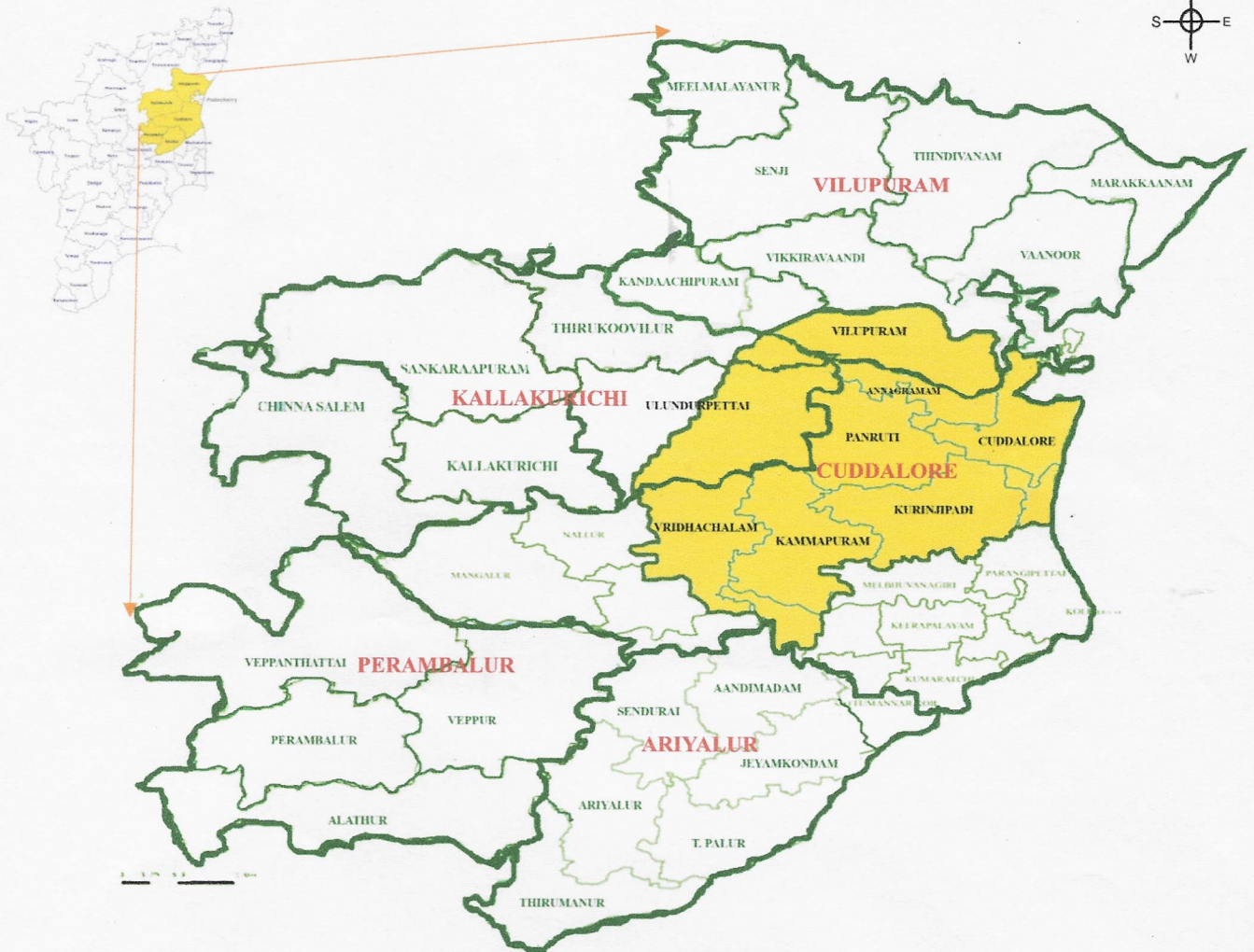
Memorandum of Understanding (MOU) was signed between the Tamil Nadu Government and Government of India in 2005 to set up the Agri Export Zone for Cashew at Panruti, the first of its in India for Cashew by the ministry of commerce. It is a joint venture between Tamil Nadu Industrial Development Corporation Ltd (TIDCO) and the Chennai-based M/s. Sattva group of companies with 26% equity participation. The project covered five districts in and around Panruti viz., Cuddalore, Thanjavur, Pudukkottai, Perambalur, and Sivaganga accounting for nearly 82% of the total cashew production in the state with 45,000-tonne capacity spread across 85,000 acres of land and 36 farmers as Shareholder.

Any cashew project development in that area can get assistance from APEDA (Agricultural and Processed Food Products Export Development Authority) besides assistance from ASIDE (Assistance to States for Development of Export Infrastructure and other activities) for the development of infrastructure facilities. A common state-of-the-art processing and packaging unit in Panruti spread across about two acres through the special purpose vehicle (SPV) has

been developed in the cashew AEZ to promote cashew exports. Cashew kernels processed from this AEZ were exported to the countries like USA, Dubai, Saudi Arabia, Syria and Singapore as deemed export sales.


PANRUTI MUNDHIRI (CASHEW) CULTIVATION AREA

INDIA>TAMILNADU> CUDDALORE



Latitude: 11° 24' 41"N to 11° 50' 16"N

Longitude: 79° 05' 06"E to 79° 47' 41"E

 - Panruti Cashew cultivation Area

S. Vignesh

M. Raj
PROFESSOR & HEAD
DEPT OF AGRL. ENGINEERING
COLLEGE & RESEARCH INSTITUTE
MADURAI - 625 104

G.I. APPLICATION NUMBER – 881

Application Date: 25-04-2022

Application is made by 1. Tamil Nadu State Agricultural Marketing Board at Chief Executive Officer, Thiru Vi Ka Industrial Estate, Guindy, Chennai - 600 032, Tamil Nadu, India and 2. Melapuliyanakudi Farmers Association at Door no – 2 (1st floor), Thevar Samudhayakattidam, Arunachala Vinayagar kovil Street, Puliyanagudi, District: Tenkasi – 627 855, Tamil Nadu, India for Registration in Part - A of the Register of **Puliyanakudi Acid Lime** under Application No. 881 in respect of Lime falling in Class – 31 is hereby advertised as accepted under Sub-section (1) of Section 13 of Geographical Indications of Goods (Registration and Protection) Act, 1999.

- A) Name of the Applicant :**
- 1. Tamil Nadu State Agricultural Marketing Board
 - 2. Melapuliyanakudi Farmers Association
- B) Address :**
- 1. Tamil Nadu State Agricultural Marketing Board,
Chief Executive Officer, Thiru Vi Ka Industrial Estate, Guindy, Chennai - 600 032, Tamil Nadu, India
 - 2. Melapuliyanakudi Farmers Association,
Door no – 2 (1st floor), Thevar Samudhayakattidam, Arunachala Vinayagar kovil Street, Puliyanagudi, District: Tenkasi – 627 855, Tamil Nadu, India

Facilitated By:

NABARD Madurai Agri Business Incubation Forum, Madurai

- C) Name of the Geographical Indication :**

PULIYANKUDI ACID LIME



- D) Types of Goods :** **Class 31 – Lime**
- E) Specification:**

Puliyanagudi Acid Lime (*Citrus aurantiifolia*) is a highly valued lime variety cultivated in the Puliyanagudi region of Tamil Nadu, India. Known for its distinctive characteristics, this lime plays a significant role in local agriculture and economy, especially in Southern Tamil Nadu.

Key Characteristics of Puliyangudi Acid Lime:

Size and Shape:

The fruit is small to medium-sized, typically 4 to 6 cm in diameter.

It has a round to slightly oval shape with smooth, thin skin that is bright green when ripe.

Flavor and Pulp:

Puliyangudi acid lime is known for its intense, tangy, and aromatic flavor, characterized by its high acidity.

The pulp is typically pale green to yellowish-green and is juicy, making it highly prized for its juice content.

Harvesting:

The fruit is mainly harvested between January and April, which corresponds to the peak lime season in the region.

Economic and Culinary Significance:

Puliyangudi acid lime is widely used in South Indian cuisine, particularly in beverages, curries, and as a flavoring agent.

The lime's high juice yield and intense flavor make it an essential ingredient in many local dishes, particularly in the preparation of lime-based drinks like lime soda and lemon rice.

The lime is also in demand for preservation in the form of pickles and sauces.

Nutritional Value:

The fruit is rich in vitamin C and antioxidants, offering significant health benefits, including boosting immunity and aiding digestion.

Geographical Significance:

Puliyangudi is often referred to as the "Lemon City of Tamil Nadu" due to its prominence in lime cultivation.

The Tenkasi district ranks second in Tamil Nadu for acid lime cultivation, covering 2178 hectares and producing approximately 12,196 tonnes annually.

Lime from Puliyangudi and neighboring areas such as Sankarankovil, Kadayam, Kadayanallur, and Kuruvikulam is widely distributed, with a significant portion sent to Kerala, Karnataka, and major Tamil Nadu cities.

Special Lime Varieties:

Kadayam Lime:

A traditional lime variety cultivated in the region, known for its taste, juiciness, and market value. Kadayam limes are considered highly aromatic and are in demand both locally and for export.

PKM 1 Lime:

Developed by Tamil Nadu Agricultural University (TNAU), PKM 1 Lime is a clonal selection from the seedling progenies of the Kadayam local type of lime.

This variety is known for its high yield and superior quality, making it a prominent cultivar in the region's lime production.

Agricultural Practices and Economic Impact:

Puliyangudi lime cultivation supports the local economy and is a major livelihood for farmers in the Tenkasi district. The region benefits from the tropical climate, characterized by warm temperatures and well-drained sandy loam or loamy soils, ideal for growing high-quality acid lime. Lime markets in the region cater to both local consumption and the export market, particularly to states like Kerala and Karnataka, and urban centers across Tamil Nadu.

Puliyangudi acid lime plays a vital role in the agricultural landscape of Southern Tamil Nadu, contributing to both cultural and economic life in the region.

Sr. No.	Particulars	Puliyankudi acid lime
1	Plant height	3.15
2	Plant spread (m) (East– West)	2.90
	Plant spread (m) (North - South)	3.32
3	Canopy volume (m ³)	4.933
4	Number of fruits per tree	905.70
5	Fruit girth (cm)	3.35
6	Fruit weight (g)	39.50
7	Fruit volume (cc)	37.30
8	Yield per tree (kg)	35.77
9	Yield per ha (t/ha)	9.91
10	Fruit harvest	Throughout the year
	TSS (Brix)	6.78
11	Fruit juice content	31.30
12	Ascorbic acid content (mg/100 g)	24.10
13	Acidity (%)	6.35
14	Market preference	Good
15	Bacterial canker	Susceptible

F) Description:

The genus *Citrus* L. belongs to the subtribe Citrinae, tribe Citreae, subfamily Aurantioideae of the family Rutaceae. Acid lime (*Citrus aurantifolia* Swingle) is a commercially important citrus crop is grown across different states of the country. Citrus fruits are classified as non-climacteric, because, it releases very low amounts of ethylene during ripening and a perishable fruit. It is more popular for its uses in the preparation of refreshing juice, making of pickles, and in seasoning foods which are very popular not only in India but also in other parts of the world.

Acid lime trees are small, and bushy with small but sharp spines. Leaves are small with narrowly winged petioles. Flowers and fruits are small. Flowers are borne on two types of shoots, one with leaves and the other without leaves. Leafy inflorescences are borne on new wood, while leafless inflorescences are borne on old wood. Leafy inflorescences are more productive than leafless inflorescences, thus the presence of leaves is essential for production.

It is a shrubby tree, up to 4 m tall, with spiny branches. The leaves are ovate or elliptic with the narrowly winged petiole. The flowers are yellowish-white with a light purple tinge on the margins, in clusters of 3-5 flowers in the axil of leaves. Fruits are rounded, smooth surface, greenish-yellow or yellowish at maturity, thin rind and strong adherence with endocarp, pulp light greenish, juicy, segments 6-10, solid axis, and juice very sour. Seeds are ovoid in shape, creamish cotyledons, brown chalazal cap, and polyembryonic.

PKM 1 Lime (Jai Devi)

It is a selection from the Kadayam local of lemon from the Tenkasi district of Tamil Nadu. The tree is vigorous. This can be easily multiplied as seedlings and layers. Fruits can be harvested throughout the year. The fruits are big, each weighing 52g. Fruits have higher ascorbic acid content of 34.29mg per 100g of fruit juice and TSS of 8.0°brix. The juice content is 52.3% by weight. It is a high yielder. The average yield per tree/year is 934 fruits weighing 36.975 kg. The yield increase ranges from 24.5 to 98.5% over other selections. It is less susceptible to leaf miner and citrus butterflies.

Cultural and morphological features of the isolates

Isolates	Cultural characters				Morphological characters
	Colony shape	Pigmentation	Colony margin	Colony elevation	Cell shape
Puliyankudi acid lime	Irregular	Yellow	Curled	Raised	Single rod

Sr. No.	Treatment	Mean Zone of Inhibition* (mm) a			inhibition (mm)
		100 ppm	250 ppm	500 ppm	
1	Streptomycine	26.90 (5.23)	26.75 (5.22)	26.75 (5.22)	27.05d (5.25)
2	Tetracycline	28.80 (5.41)	28.8 (5.41)	30.95 (5.61)	29.52 c (5.48)
3	Streptomycin + Tetracycline	20.35 (4.57)	21 (4.63)	25 (5.05)	22.12e (4.75)
4	Cefixime	31.55 (5.66)	33.95 (5.87)	37.05 (6.13)	34.18 b (5.89)
5	Cefatoxime	36.00 (6.04)	37.65 (6.18)	43.55 (6.64)	39.07 a (6.29)
6	Gentamycin	18.35 (4.34)	21.45 (4.69)	23.15 (4.86)	20.98f (4.63)
7	Amoxillin	23.10 (4.85)	27.55 (5.29)	28.95 (5.43)	26.53d (5.19)
8	Chloramphenicol	19.95 (4.52)	22.45 (4.79)	23.75 (4.92)	22.05e (4.75)
9	Control	0.00 (0.71)	0.00 (0.71)	0.00 (0.71)	0.00g (0.71)

G) Geographical area of Production and Map as shown in page no:

Place	District	Geographical location	
		Latitude	Longitude
Puliyankudi	Tenkasi	9°1725' N	N 77°3956' E

Puliyankudi is located in the southern extreme of Tamil Nadu State and it is located near the foothills of Western Ghats in the coordinates of 9°10' N 77°25' E. The list of lime growing areas is listed below,

- Puliyangudi
- Vasudevanallur
- Kadayanallur
- Kuruvikulam
- Sankarankovil
- Kadayam
- Melaneelithanallur

H) **Proof of Origin (Historical records):**

1. **"The Madras Agricultural Journal"** published in **January 1940**, is a compilation of research articles of the Madras region. The book compiled the article "A survey of fruit cultivation in Kadayam" by Venkatakrishnan, Agricultural Demonstrator, Srivilliputhur. The article highlighted the cultivation practices and uniqueness of the lemon grown in the kadayam region, Tirunelveli district.

2. **"Census of India – Volume III Madras and Coorg – Part I – 1951"** printed by "The Superintendent, Government Press, Madras" written by the S.Venkateswaran, I.C.S., Superintendent of the census for Madras and Coorg published in 1953. The census report described that ***"Kadayam and Pudur in Trinulveli districts are electrified and electric power used for irrigating the famous lime gardens in the town"***.

I) **Method of Production:**

Soil

Citrus can grow well in a wide range of soils but it prefers deep, well-drained loamy soils. The best pH is 5.5 to 7.5, good drainage is an important prerequisite of soils and the water table should be always below 2.0 meters. Citrus thrives well in frost-free subtropical to semi-tropical climates. However, each citrus kind needs a specific climate for its better performance. Places receiving high rainfall and high humidity are unsuitable. High calcium carbonate concentration in feeder root zone may adversely affect the growth.

Climate

Citrus fruits in India are cultivated under varied agro-ecological conditions right from arid and semiarid areas of the southwest region to the humid tropical climate of northeast India. Citrus trees are evergreen, grown in truly subtropical climates of the world although in tropical regions of the world. Citrus fruits grow best between a temperature range of 13°C to 37°C. Temperatures below – 4°C are harmful to young plants. Soil temperature around 25°C seems to be optimum for root growth. High humidity favours the spread of many diseases. Frost is highly injurious. Hot wind during summer results in desiccation and drop of flowers and developing fruits.

Propagation

Citrus fruits are propagated both by vegetative and seedling means. Since most of the species exhibit polyembryony, the nucellar seedlings obtained through seed propagation carry the true characteristics of the mother plants. Selection of a suitable rootstock for each citrus kind is an important factor as a large number imparts varying effects on the vigor, precocity, productivity, longevity, of graft compatible species and cultivars are available, however, each one of the fruits besides resistance to pests and diseases. A good rootstock for citrus should ensure an economic orchard life of about 30-50 years along with tolerance or resistance to virus diseases.

In addition to it, it must be polyembryonic, easily propagatable problems with adequate and cheap sources of seeds.

Acid lime is propagated through seedlings while lemon is propagated either through layers, cuttings or seedlings.

Planting Material

Availability of quality planting material is of utmost importance in citrus cultivation. Citrus plants are very sensitive to various biotic and abiotic stresses. Therefore, the selection of an ideal rootstock is a continuing challenge for the citrus industry of India. Primary nursery beds are prepared on light fertile soils or in the HDPE trays under shade net structures. The selection of nucellar seedlings is done by eliminating weak seedlings, off-types, and non-uniform seedlings in 2-3 stages in the nursery beds. Secondary nursery seedlings may be raised in polythene bags also as they become ready for plantation in the main field after attaining a height of about 30-40 cm after one year.

Land preparation

Land needs to be thoroughly ploughed and leveled. In hilly areas, planting is done on terraces against the slopes and on such lands, high-density planting is possible as more aerial space is available than in flatlands. Since citrus trees are highly sensitive to waterlogging and water stagnation during the rainy season providing drainage channels of 3-4 feet depth along the slopes around the orchard is essential.

Plant density

Limes/lemons (*Citrus aurantifolia* Swingle & *Citrus limon*) Normal spacing – 6 x 6 m / 5 x 5 m, Plant population – 277/400 per ha.

Planting

The best season for planting is June to August. Pits of the size of 1m x 1m x 1m may be dug for planting seedlings. 15-20 kg of FYM and 500g of superphosphate is applied per pit while planting.

Irrigation

Citrus requires critical stage watering in the initial year. It further reduces fruit drops and increases the fruit size. Diseases like root rot and collar rot occur in flooded conditions. Light irrigation with high frequency is beneficial. Irrigation water containing more than 1000 ppm salts is injurious. The quantity of water and frequency of irrigation depends on the soil texture and growth stage. Micro-irrigation systems not only save water and nutrients but also ensure good retention of fruits during crucial stages of crop growth in March – April even in situations where water is not a limitation.

Harvesting

On attaining proper size, and shape along with attractive color having TSS to the Acid ratio of 12:1, lime fruit is ready for harvest. Depending upon the variety fruits are generally ready for harvesting in Mid- January to Mid- February. Do harvesting at the proper time as too early or too late harvesting will give poor quality.

After Cultivation

Water shoots, rootstock sprouts dead, and diseased shoots are to be removed regularly. In the young budded plants or seedlings, the laterals should be removed up to 45 cm from the ground level. In the young orchards, ploughing may be done to keep the field free from weeds, and

hoeing with a spade in older orchards. In the early stages of the establishment of a citrus orchard till bearing, the inter-space can be utilized with short-duration crops (leguminous types). Wherever soil, erosion is a problem, cover crops may be grown.

Variation of quantity of products during off season and full season (mention elaborately)

The productivity is 4000 fruits per tree per year in Puliangkudi acid lime and it takes 135 days to mature (from flowering to harvest, in summer) and 150 days in winter.

Sr. No	Particulars	Puliangkudi Acid lime
1	Plant height	3.15
2	Plant spread (m) (East– West)	2.90
	Plant spread (m) (North - South)	3.32
3	Canopy volume (m ³)	4.933
4	Number of fruits per tree	905.70
5	Fruit girth (cm)	3.35
6	Fruit weight (g)	39.50
7	Fruit volume (cc)	37.30
8	Yield per tree (kg)	35.77
9	Yield per ha (t/ha)	9.91
10	Fruit harvest	Throughout the year
11	Fruit juice content	31.30
12	Ascorbic acid content (mg/100 g)	24.10
13	Acidity (%)	6.35
14	Market preference	Good
15	Bacterial canker	Susceptible

J) Uniqueness:

The Puliangkudi Lime, particularly the Kadayam Lime variety, stands out for several unique characteristics that make it highly valued in the agricultural, culinary, and commercial sectors. These distinctive features include:

1. High Ascorbic Acid Content:

Puliangkudi Lime, especially the Kadayam Lime, is known for its exceptionally high ascorbic acid content (around 34.3 mg/100g). This contributes to its nutritional richness, making it a great source of vitamin C, which boosts immunity and offers various health benefits.

2. Superior Juice Content:

Each lime fruit typically contains 55% juice, which is notably high compared to many other lime varieties. This high juice yield makes Puliangkudi Lime ideal for beverages, juices, and culinary use, providing more product per fruit and making it commercially attractive.

3. Distinctive Sourness and High Acidity:

The lime juice is very sour, with titratable acidity ranging between 77.90 g/l and 95.50 g/l and a low pH (between 1.94 and 2.07). This high acidity gives the lime a sharp tangy flavor, which is highly sought after in South Indian cuisine and beverages.

4. Thin Peel and Essential Oils:

Puliyangudi Lime has a thin peel (around 3mm) that is rich in essential oils. These oils are often used in perfumery, giving the lime a fragrant aroma, which is a unique aspect of the variety. The wax-like substance on the peel gives it a shiny appearance and offers protection during packaging and transportation, reducing damage and overpressure on the fruit.

5. High Yield:

Each tree bears around 950 fruits on average, with individual fruits weighing between 42g and 50g. This high yield ensures a steady and abundant supply of limes, which supports both local consumption and commercial distribution.

6. Economic Importance:

Puliyangudi Lime plays a significant role in the regional economy, supporting the livelihoods of farmers in the Tenkasi district and other neighboring areas.

The lime is particularly important for local markets and is widely distributed to neighboring states like Kerala, Karnataka, and urban centers in Tamil Nadu, contributing to the lime trade in South India.

7. Commercial and Culinary Applications:

Puliyangudi Lime's high juice content, acidity, and distinctive flavor make it a preferred choice for a variety of culinary uses, such as making lime-based beverages (like lime soda) and flavoring for dishes such as lime rice and curries.

The wax coating on the peel also makes it ideal for transportation and longer shelf life, making it a practical choice for both local and export markets.

8. Unique Growing Conditions:

The lime thrives in the soils of Puliyangudi, which are primarily sandy loam and clay soils, ideal for lime cultivation. The region's warm climate and good drainage support the production of high-quality fruits with dense juice and sharp acidity.

The presence of natural water sources like the Seelampara Peri Odai that flows through the area further enhances the agricultural productivity of the region.

9. Cultural Significance:

The Puliyangudi Lime, especially the Kadayam Lime, is an integral part of the local culinary culture, often used in traditional South Indian recipes like lime rice, pickles, and lime juice. It is a symbol of the region's agricultural heritage.

The Puliyangudi Lime is unique for its high juice yield, intense acidity, rich vitamin C content, thin peel, and essential oils. These characteristics not only make it an essential ingredient in South Indian cuisine and beverages but also make it commercially viable for export markets. The lime's combination of high productivity, unique flavor, and economic importance makes it a standout product in the lime cultivation landscape of Tamil Nadu.

The Virudhunagar Samba Chilli is cultivated in the Virudhunagar district of Tamil Nadu under specific soil and climatic conditions, which significantly contribute to its unique characteristics.

Soil

Black Soil and Red Loam are the two predominant soil types in the Virudhunagar district.

Red Loam is found mostly in areas such as Rajapalayam, Watrap, and Srivilliputhur. This soil type is well-draining and contributes to the growth of flavorful chilies due to its good nutrient content.

Black Soil is found in areas like Sattur, Srivilliputhur, and Aruppukottai. Black soil retains moisture and is rich in minerals, making it ideal for the cultivation of heat-loving crops like chillies.

The southern and eastern parts of Sattur taluk have red loam and sand, which provides the right balance of drainage and fertility.

The presence of laterite or red soil in most parts, with the fertile valley of the Vaigai River running through the region, creates an environment ideal for the unique qualities of the Virudhunagar Samba Chilli.

Climate

Warm and Humid Climate: The ideal growing conditions for chillies are a combination of warm temperatures and humidity, which are abundant in the Virudhunagar district.

Dry Weather During Maturity: Dry weather during the fruit's maturation period is crucial for the development of the chili's flavor and pungency.

High Light Intensity: Exposure to intense sunlight increases the pungency of the fruits, making the chillies hotter and more flavorful.

The district experiences temperatures ranging from 37.9°C to 23.5°C, with the hot climate acting as a key factor in the chili's unique flavor profile and quality.

Morphological Characteristics

Plant Height: 65 - 98 cm

Fruit Length: 6.8 - 7.3 cm

Pericarp Thickness: 0.19 mm

Calyx Margin: Dentate (Enveloping)

Calyx Annular Constriction: Present

Fruit Shape: The fruit has a slight bend at the edges.

Biochemical Parameters:

Color: The Virudhunagar Samba Chilli has a bright red color, with an ASTA color value of 59.1 units.

Pungency: The chili has a moderate level of heat, with 0.24% capsaicin content. This level of pungency is ideal for traditional cooking and spice blends.

Oleoresin Content: This chili variety has a high oleoresin content of 18.105%, which contributes to its vibrant color and flavor. Oleoresin is a natural extract derived from dried chili and is valued for its deep red color and the presence of carotenoids. Oleoresin is sensitive to light, heat, and air, which makes its extraction a careful process.

Oleoresin Application: Due to its high capsaicin and oleoresin content, Virudhunagar Samba Chilli is favored in the value-added industry, especially for oleoresin extraction, which is used in the production of chili powders, sauces, and other spice products.

The Virudhunagar Samba Chilli owes its unique flavor, color, and pungency to the specific soil conditions, climate, and biochemical properties of the region. The combination of red loam, black soil, and the presence of the Vaigai River contributes to the chili's distinctive flavor, while the warm climate, dry weather during maturity, and high light intensity enhance its pungency. The biochemical composition, including high oleoresin content, also adds to its significance in the spice industry. All of these factors make the Virudhunagar Samba Chilli a sought-after and valuable ingredient in South Indian cuisine and the spice market.

K) Inspection Body:

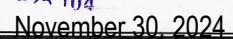
In the future, the inspection body will be formed which may be constituted by the below-mentioned persons to keep a check on the quality of the products.

- District Collector, Tenkasi, Head of the Inspection Body
- Chief Executive Officer, TANSAMB, Chennai
- Deputy Director (Agribusiness), Tenkasi
- One member of the Co-Applicant
- District Development Manager, NABARD, Tenkasi / Tirunelveli
- CEO, NABARD Madurai Agribusiness Incubation Forum, Madurai
- One member from Horticulture Department, Tenkasi
- One member from Sulashana Panneer Selvam, IPR for Agriculture and Rural Development Centre (NGO)

This inspection body formed by the applicant will be acting independently to ensure the quality check upon the goods and the applicant also undertakes that the inspection body will keep the check on the quality, manufacturing, and mechanism of the goods. The abovementioned persons may constitute the inspection body.

L) Others:

INDIA>TAMILNADU> TENKASI



G.I. APPLICATION NUMBER – 883

Application Date: 25-04-2022

Application is made by 1. Tamil Nadu State Agricultural Marketing Board at Chief Executive Officer, Thiru Vi Ka Industrial Estate, Guindy, Chennai - 600 032, Tamil Nadu, India and 2. Virudhunagar Chillies Merchants Association at 9/1, Post: Street, District: Virudhunagar – 626 001, Tamil Nadu, India for Registration in Part - A of the Register of **Virudhunagar Samba Vathal** under Application No. 883 in respect of Chilli falling in Class – 31 is hereby advertised as accepted under Sub-section (1) of Section 13 of Geographical Indications of Goods (Registration and Protection) Act, 1999.

- A) Name of the Applicant :** 1. Tamil Nadu State Agricultural Marketing Board,
2. Virudhunagar Chillies Merchants Association
- B) Address :** 1. Tamil Nadu State Agricultural Marketing Board, Chief Executive Officer, Thiru Vi Ka Industrial Estate, Guindy, Chennai - 600 032, Tamil Nadu, India
2. Virudhunagar Chillies Merchants Association, 9/1, Post: Street, District: Virudhunagar – 626 001, Tamil Nadu, India

Facilitated By:

NABARD Madurai Agri Business Incubation Forum, Madurai

- C) Name of the Geographical Indication :**

VIRUDHUNAGAR SAMBA VATHAL



- D) Types of Goods :** **Class 31 – Chilli**

- E) Specification:**

Virudhunagar Samba Chilli, grown in Tamil Nadu's Virudhunagar district, is a distinguished variety celebrated for its unique flavor, moderate heat, and vibrant red color. Its wrinkled texture and medium size make it stand out in South Indian cuisine. Known for its aromatic profile, it

features a balance of smokiness and spiciness, enhancing the taste and appearance of dishes. It is widely used in traditional spice blends, pickles, and seasonings.

The cultivation of Samba Chilli primarily takes place in Tamil Nadu's Virudhunagar, Ramanathapuram, Sivagangai, and Thoothukudi districts, with major markets located in Virudhunagar, Sattur, Thoothukudi, and Ramnad. The long, slender shape of the chillies, measuring 6–6.5 cm with sharp tips and bulged shoulders, is referred to as "Virudhunagar Samba Chilli (Vathal)." These chillies are bright red, hot, and highly valued for their flavor profile. The local production in the Virudhunagar district is particularly significant for the chili-processing industry, especially for oleoresin extraction.

In terms of quality, Virudhunagar Samba Vathal has an ASTA color value of 59.1 units, indicating a rich, vibrant red hue. The pungency level, with 0.24% capsaicin content, makes it a preferred choice in spice production, particularly for its role in value-added products. The traditional farming practices employed help preserve the chili's authentic taste and nutritional benefits, ensuring its continued prominence in South Indian culinary traditions.

The Virudhunagar Samba Chilli is distinguished by several morphological characteristics that make it unique among other chili varieties. These characteristics contribute to its popularity and distinct flavor profile. Here are the key morphological features of the Virudhunagar Samba Chilli:

Size:

The Virudhunagar Samba Chilli is medium-sized, typically measuring around 6 to 6.5 cm in length.

Shape:

The chili has a long, slender shape with a sharp tip and bulged shoulders. This gives it a distinctive appearance that makes it easily recognizable.

Color:

The chili has a bright, shiny red color when mature, which is a hallmark of the variety. This vibrant color adds to its appeal, especially in culinary presentations.

Texture:

The surface of the Virudhunagar Samba Chilli is wrinkled, giving it a unique texture that further differentiates it from other varieties.

Pungency:

It has a moderate level of heat, with a capsaicin content of 0.24%, contributing to its balanced spiciness, which is neither too mild nor overly hot. This moderate heat makes it suitable for a wide range of dishes.

Aroma:

The chili is known for its aromatic profile, with hints of smokiness that enhance its overall flavor.

Skin Thickness:

The skin of the chili is relatively thin, which makes it suitable for processing into dried forms, such as in the preparation of Samba Vathal (dried chili).

Seeds:

The chili contains a moderate number of seeds, which contribute to its pungency and flavor intensity when used in cooking or spice blends.

These morphological traits of the Virudhunagar Samba Chilli make it a prized variety, particularly in South Indian cuisine, where its flavor, color, and heat are essential in creating a variety of traditional dishes, spice blends, and pickles.

F) Description:

Chilli (*Capsicum* spp.) is an important vegetable cum spice crop grown in the tropical, subtropical as well as temperate regions. India is the largest producer of chillies in the world. The Virudhunagar Samba Chillies are local cultivars or landraces. These are variable plant populations adapted to local agro-climatic conditions, which are locally named, selected and maintained by the traditional farmers to meet their social, economic, cultural and ecological needs.

Black soil and Red loam are the predominant soil types in the Virudhunagar district. Red loam occurs mostly in the areas of Rajapalayam, Watrap and Srivilliputhur and black soil is found in Sattur, Srivilliputhur, Aruppukottai. Co1 and K2 are some of the varieties of Virudhunagar samba and are available in Sattur, Kovilpatti, Vilathikulam, Ramnad and surrounding areas.

Morphological characterization of chilli genotypes based on DUS guidelines

S.No	Characters	Details
1.	Plant height (cm)	46 -65 cm
2.	Plant growth habit	Intermediate
3.	Branching habit	Intermediate
4.	Leaf density	Intermediate
5.	Leaf colour	Dark green
6.	Leaf shape	Lanceolate
7.	Leaf profile in cross section	Flat
8.	Lamina margin	Entire
9.	Leaf pubescence	Dense
10.	Leaf length (cm)	Less than 10 cm
11.	Leaf width (cm)	Less than 3 cm
12.	Fruit length	6.8 -7.3 cm
13.	Fruit Shape	Slender
14.	Days to 50% flowering	65 – 80 days
15.	Pericarp thickness	0.19mm
16.	Number of flowers per axil	3 or more
17.	Flower position	Erect
18.	Corolla colour	White
19.	Corolla shape	Rotate
20.	Corolla length (cm)	1.5 -2.5 cm
21.	Calyx Margin	Dentate (Enveloping)
22.	Calyx annular constriction	Present

23.	Anther colour	Pale blue
24.	Filament colour	White
25.	Calyx margin	Dentate
26.	Cotyledonous leaf colour	Light green
27.	Cotyledonous leaf shape	Lanceolate
28.	Stem colour	Green with purple
29.	Nodal anthocyanin colour	Purple
30.	Stem pubescence	Dense
31.	Crop Duration	210 days
32.	Green Chilli	3.42 t/ha
33.	Dry Chilli	1.80 t/ha

S.No	Other Varieties	Characteristics	Yield/ha
1	K2	It was a cross of K 1 and Sattur samba. Crop duration of 210 days	2.10 tonnes
2	CO1	Reselection from Sattur samba. Fruits are long, bright red in colour. Crop duration of 210 days. Fruits have high capsaicin content (0.72mg/g).	2.10 tonnes

G) Geographical area of Production and Map as shown in page no:

Virudhunagar Samba Vathal is grown in Virudhunagar district which is located between the coordinates Latitude 9° 18' 07" N to 9° 25' 55" N; Longitude 77° 46' 40" E to 78° 03' 32" E

H) Proof of Origin (Historical records):d

“**Tamil Nadu District Gazetteers - Ramanathapuram**” a report titled “Gazetteer of India” published by “Government of Tamil Nadu”. It was compiled by Dr.A.Ramaswami, District Gazetteers and published in 1972.

The gazette related to the history, people, culture, occupation and agriculture of the Ramanathapuram District, where it highlighted the Sattur Samba chilly cultivation in the areas of Sattur and other areas.

The report stated the unique soil condition of the Sattur taluk, “The southern and eastern parts of the Sattur taluk consist of red loam and sand. The rest of the country generally consists of huge expanse of laterite or red soil which is cut through the centre by the fertile valley of the river Vaigai. The soil in the coastal and eastern taluks is sandy or red loam or a mixture of both”.

The report also given the cultivation, productivity and production details of chilly and clearly stated that “Sattur, Rajapalayam and Virudhunagar areas cultivate a variety popularly known as Sattur Samba (Sannam). This variety is exported to Ceylon via Tuticorin.”

I) Method of Production:

CLIMATE

Chillies grow well in warm and humid climates but dry weather is also necessary during the maturity of fruits. Being a hot weather crop, it cannot be planted until the soil is warm enough and all the danger of frost has passed. Good seed germination occurs at a soil temperature of 65°F to 85°F. High light intensities increase the yield but reduce the pungency, and the colour development of fruits is also delayed considerably. It can be grown up to an altitude of 2000 metres above sea level. Dew and heavy rains are also injurious to the crop causing flower buds and fruits to drop off.

SOIL

An ideal soil for growing chilli is light loamy soil rich in lime. Still, it can be grown in a variety of soils provided they are well-drained and rich in organic matter. In sandy soils, the crop can be grown with success, provided irrigation and fertilizer application are adequate. As a rain-fed crop, well-drained black soils are also suitable. Acidic and alkaline soils are not suitable for chilli growing. Chilli can be grown in saline but the germination and early vigour of plants are affected by the salinity of the crop.

LAND PREPARATION

In the study area, most of the farmers use power tiller for land preparation and a very little percentage of farmers use the country plough. The land is ploughed 5 to 6 times and planked smooth before preparing the seedbed. Farmyard manure or compost is added after the first ploughing so that it is thoroughly mixed in the soil during the subsequent ploughing, and then the field is brought into a condition of fine tilth. Then beds of suitable sizes are made in the field.

RAISING OF SEEDLINGS

After land preparation, plants are sown in rows. Generally, the distance between two rows is 60 to 70 centimetres and the distance between 2 plants is 30-40 centimetres. Planting should be done in the afternoon and watering is necessary 2/3 days in the morning and afternoon. Chilli is grown from seeds that are very light and remain viable for 2-3 years. Nursery beds for chilli are made near the partially shaded area. Areas selected for nurseries are prepared to a fine tilth and farmyard manure or compost is applied at 20-25 tonnes per hectare. Roughly one kg seed in 3 cents of nursery area will meet the requirement of planting one hectare. The seeds are sown thinly in lines spaced 5 cm apart. Sand and well-decomposed farmyard manure are spread over the seeds. To avoid damage by ants, BHC 10 per cent dust is applied along the borders as well as on beds. Fine mulching with paddy straw can be given to prevent excessive moisture loss. The mulch is removed as soon as the seeds start germinating. Water is not allowed to stagnate on the bed. Weeding, hoeing and other practices in the nursery beds are done as and when required. In Tamil Nadu, there are three seasons of chilli growing viz. June – July, September – October and March – April.

Top Dressing

The first dressing of 10-20g calcium or sodium nitrate per square metre should be applied when the first true leaves develop. This should be repeated a week later. This second application must be dissolved in water and applied uniformly to the bed just before watering.

Seedbed Pest and Disease control

Hygiene is critical in this process. Seedbed site and surrounding area must be kept free of weeds as they are a fine source of pest and disease infection. Sterilize all tools and other materials used at the seedbed site. Diseases of economic importance are anthracnose, Alternaria, sore skin and Trichoderma. Chemicals for the treatment of a disease may be sourced from agro-dealers. Pests of importance are ants, cutworms, leaf miners, aphids and thrips.

Hardening

At about four 4 weeks before lifting begin hardening. Withhold water until seedlings show stress or wilt as early as 9.30 am. Then water with a thorough soaking to 12cm depth and leave again until wilting occurs at 930am. Repeat the process 3 days before lifting.

Clipping and Root Pruning

These are done to promote root development and to check seedling overgrowth respectively. These operations should be done hygienically.

Lifting

Three days before lifting – first thorough watering. Two 2 days before watering – apply Baytan 15 WP drench, and 6 hours later apply an aphicide drench. One day before lifting – final watering late in the afternoon. Throughout lifting, the beds must be kept moist. As soon as lifting is complete, destroy the seedbed.

Transplanting

The land must be brought to a suitable tilth and irrigated to field capacity before transplanting. Spacing ranges from 18 -20cm x 1-1.3. Directly sown spacing is 20cm x 1.4m for an early September crop. A mid-November in situ (under natural conditions seeded) seeded crop requires a spacing of 18cm x 1.1m.

TRANSPLANTING

The chilli seeds germinate in 6-10 days and the seedlings are ready for transplanting in 40-45 days. Short and thick – stemmed seedlings are ideal for better performance. Mild sunlight should be preferred for transplanting. Thus, cloudy weather or evening hour is better for rainy season planting. The planting distance between row to row and plant to plant varies according to the variety, season and region. However, planting a single seedling at 15 cm(plant to plant) and 30 cm (row to row) is generally kept.

MANURES AND FERTILIZERS

Chilli has a long growing season and, therefore, needs a judicious use of manures and fertilizers. Fertile soils with sufficient humus are very good for growing chilli. Suboptimal levels of major nutrients often lead to deficiency symptoms in chilli. It starts with application of cow dung. About 10 Metric Tonne of cow dung is needed for one hectare of land. Other fertilizers required are Urea (250 kg), Triple Super Phosphate (TSP) (200kg), and Muriate of Potash (MOP) (150 kg). All TSP and 50 kg of MOP are applied during land preparation. After 25 days of planting seedlings, 84 kgs of Urea and 34 kgs of MOP fertilizers are to be broadcast on the surface land. Second and third doses of fertilizers are to be applied on the surface land after 50days and 70 days of planting. Each time 83 kgs of Urea and 33 kgs of MOP fertilizers are to be applied after irrigation. However, it has been observed that farmers in the study area use all fertilizers at the beginning of cultivation. They also use more Urea than the recommended limits.

IRRIGATION

Irrigation and water management is critical in chilli cultivation. The plants have shallow root systems. Normally, 4-5 irrigations are needed due to sandy nature of the land. First irrigation starts after 15-20 days of sowing. Chilli does not tolerate drought. They need water during the flowering and the fruiting stage is especially high. Fields should be irrigated if there are signs of wilting at midday. Chilli plants are sensitive to water logging. Flooded fields should be drained within 48 hours. Otherwise, the chilli plants will soon die. First irrigation is given immediately after transplanting and subsequent irrigation are given at 5 days or one week's interval depending upon

the moisture retaining capacity of the soil, weather and frequency of rainfall during summer and rainy season. In winter, irrigation is done at 10 days interval.

WEEDING

Weeding starts after one month when the plants are at two leaves stages; weeding is necessary in every month.

INTER-CULTURE OPERATIONS

Gap filling is done during second irrigation or 10 days after transplanting. Two to three hoeing should be done in the crop. Earthling may also be done 2-3 weeks after transplanting. Weeds are a serious problem in chilli field and they must be kept suppressed in the initial stage. Soil incorporation of EPTC 10 days prior to transplanting followed by the application of Nitrofen and Alchlor provides the best control of weeds without any adverse effect on the chilli crop.

HARVESTING AND YIELD

For green chillies harvesting starts after 15 days of flowering. For red dry chilli farmers have to wait until the chilli is reddened. Normally 10-11 Metric Tonne of green chilli or 1.5-2 MT of red dry chilli can be produced on one hectare of land. In India, field sown crops are mainly grown to stimulate further flush of flowering and fruit set. In Tamil Nadu, the stage of picking either green or red depends upon the market needs. Flowering begins 1-2 months after transplanting and it takes another month for green fruits. Thereafter, ripe fruits are picked at an interval of 1-2 weeks and harvesting continues over a period of about three months. The number of picking varies from 6-10 depending upon the season, cultivar and cultural practices. Chilli crop normally yields 2 to 2.50 tonnes dry chilli and 7.5 to 10 tonnes green chilli from one hectare.

DRYING OF CHILLI

After harvesting, chill fruits may be dried by spreading them on the floor or the roofs of the houses. These are to be turned up and down daily. If the proper colour is not fully developed, the fruits may be heaped up until it is well developed. The heaps are then spread out again in thin layers for drying and stirred frequently. The drying fruits are heaped in the evening and covered with tarpaulin or gunny bags and are spread again in the morning till they are completely dried up. When the fruits are half dried, and still flaccid, they may be trampled over once or twice to flatten the fruits and to facilitate drying and packing in the gunny bags for storage and transport. Processing green into dry chilli is done in different ways. The most common technique used by farmers in the area is open-air sun drying on a mat on the field or in the courtyard for 12-15 days depending on the availability of the sun light. Farmers interviewed use this type of drying. This process cannot protect chilli from dirt, insects though sometimes they use fishing net to protect chilli from poultry birds. The best technique would be a solar dryer that ensures the highest quality dry chilli.

MARKETING PRACTICES FOLLOWED FOR CHILLIES

Chillies are sold in fresh condition soon after picking. They are also sold after drying. Dried chillies are marketed in bags, whereas the fresh ones are taken to the market in the baskets, bags or by carts. Mild types of chillies are always carried to the market in the baskets. Under-ripe chillies can be very well ripened artificially by stacking them indoor for 2-3 days. The best temperature for ripening is 71°F to 77°F. Green chillies are sold as early as possible. They can be kept in good condition for at least 40 days at 32°F and at 95 to 98 per cent relative humidity. Dried chillies can be kept for a longer period, if they are stored in dry places and well protected from insect pests.

GRADING

Mostly farmers grade the chillies based on colour and size, before they are bought into the market. The damaged discoloured and immature pods are removed depending on market demand. However, at trader's level the other important quality parameters are moisture and stalks. Excess moisture adds weight to the pods, but gives room to various fungi to grow. Similarly, if the stalk of the pods is broken, exposing the seeds entirely, the seeds may fall out. On the other hand, in absence of optimum moisture the pods may break and let off the seeds. Thus, the seed and pod ratio in a lot is also a valuable parameter of grade. Apart from the apparent characters of colour, size, moisture and stalk of the pods, the following features also have weightage in grading chillies; seed and fruit ratio; seed size and hardness; thickness of the skin of the pod; and pungency.

PACKAGING

Packaging is an important function for every produce and so is in marketing of chilli. Good packaging of chilli not only facilitates convenience in transportation and storage, but also attracts consumer to pay more. The packaging reduces the marketing cost and protects the quality. In the study area, chillies are packed mostly in gunny bags. There is no uniformity in the packing size of chillies in the study area. The pack size is more than 40 kg in Tamil Nadu. Chillies are also packed in polythene bags.

STORING

The dried chilli is packed into sacks of the ordinary market size, mini or maxi bag and stored on bamboo platform or on the floor in the house. Chilli can be stored for about 12 months in this manner without any change. Transporting cost also from assembling centre to their godowns. These wholesale merchants will store the products for some time to create demand in other markets. After getting good price, they will distribute the chillies.

J) Uniqueness:

The Virudhunagar Samba Vathal is a unique and prized dried chili variety, primarily grown in the Virudhunagar district of Tamil Nadu, India. Its distinct characteristics and traditional processing methods make it stand out. Here are the key factors that contribute to its uniqueness:

1. Bright Red Color

The Virudhunagar Samba Vathal is known for its vibrant, shiny red color, which is a significant visual feature. The chillies retain this rich red hue even after drying, thanks to their high ASTA (American Spice Trade Association) color value of 59.1 units. This gives the dried chillies a visually appealing look when used in cooking and spice blends.

2. Moderate Heat with Balanced Pungency

The dried Samba Vathal maintains a moderate level of heat, with a capsaicin content of 0.24%. This makes it neither too hot nor too mild, offering a balanced spiciness that is ideal for use in traditional South Indian dishes, pickles, and spice mixes. The heat is enough to enhance the flavor of dishes without overpowering them.

3. Distinctive Aroma

The Samba Vathal has a unique aromatic profile. It exudes a smoky and earthy fragrance, which is developed through the traditional drying process. This smokiness adds a distinctive depth to the flavor, which is highly valued in South Indian cuisine.

4. Traditional Drying Process

The preparation of Samba Vathal involves a traditional sun-drying method. After harvesting, the fresh chillies are carefully dried under the sun. This natural process helps preserve their inherent flavor, aroma, and nutritional qualities, making the dried chili special compared to other varieties that may undergo different drying techniques.

5. Flavor and Texture Retention

Unlike some other chili varieties, Virudhunagar Samba Vathal retains its texture and flavor well after drying. The chillies are typically wrinkled, which gives them a rustic, authentic appearance and ensures that they maintain their intense flavor when used in cooking.

6. Culinary Versatility

The Samba Vathal is widely used in South Indian cuisine, particularly in spice blends, pickles, seasonings, and curries. Its distinct smoky flavor adds complexity and depth to various dishes. It is also valued for its ability to be rehydrated and used in traditional recipes, where its pungency and aromatic qualities shine.

7. Oleoresin Extraction

Virudhunagar Samba Vathal is also sought after in the value-added industry for the extraction of oleoresin, a concentrated form of chili extract. The high capsaicin content and the rich flavor make it an ideal candidate for this process, which is used in the production of chili powders, sauces, and other products.

8. Cultural and Geographical Significance

The Virudhunagar Samba variety is deeply rooted in the local culture and farming practices of the Virudhunagar district. The traditional farming methods used to grow these chillies help maintain their authentic taste and ensure that they are nurtured in an environment that enhances their flavor profile.

The Virudhunagar Samba Vathal is unique due to its vibrant red color, moderate heat, rich smoky aroma, traditional sun-drying method, and high-quality flavor that remains intact even in its dried form. These factors make it a highly valued ingredient in South Indian cuisine and a crucial component in many spice blends and regional dishes.

Soil

Black soil and Red loam are the predominant soil types in the Virudhunagar district. Red loam occurs mostly in the areas of Rajapalayam, Watrap and Srivilliputhur and black soil is found in Sattur, Srivilliputhur, Aruppukottai.

The southern and eastern parts of the Sattur taluk consist of red loam and sand. The rest of the country generally consists of a huge expanse of laterite or red soil which is cut through the centre by the fertile valley of the river Vaigai. These typical conditions of soil are one of the reasons for the uniqueness of the Virudhunagar Samba chilly.

Climate

Chillies grow well in warm and humid climates but dry weather is also necessary during the maturity of fruits. High light intensity also increases the pungency of the fruits.

The Virudhunagar district receives maximum and minimum temperatures between 37.9 – 23.5 °C. The hot climate of the chilli growing areas acts as an important parameter of the quality of the chillies.

Morphological characteristics

S. No	Characters	Details
1.	Plant height (cm)	65 -98 cm
2.	Fruit length	6.8 -7.3 cm
3.	Pericarp thickness	0.19mm
4.	Calyx Margin	Dentate (Enveloping)
5.	Calyx annular constriction	Present
6.	Fruit Shape	Slight bend in the edges of the fruit

Biochemical parameters

Virudhunagar Samba chilly is known for its characteristic bright red colour with an ASTA colour value of 59.1 units and a pungency level of 0.24% capsaicin content. Having a good capsaicin content, Samba chillies is preferred in the value addition industry, especially for oleoresin extraction.

Oleoresin is a deep red coloured, semi-viscous liquid extracted from dried red pepper. It draws its deep red colour from various Carotenoids present in the red chilli. Oleoresin is a natural extract without any antioxidants. It is highly sensitive to light, heat and air. The chilli has 18.105% of Oleoresin content.

K) Inspection Body:

In the future, the inspection body will be formed which may be constituted by the below - mentioned persons to keep a check on the quality of the products.

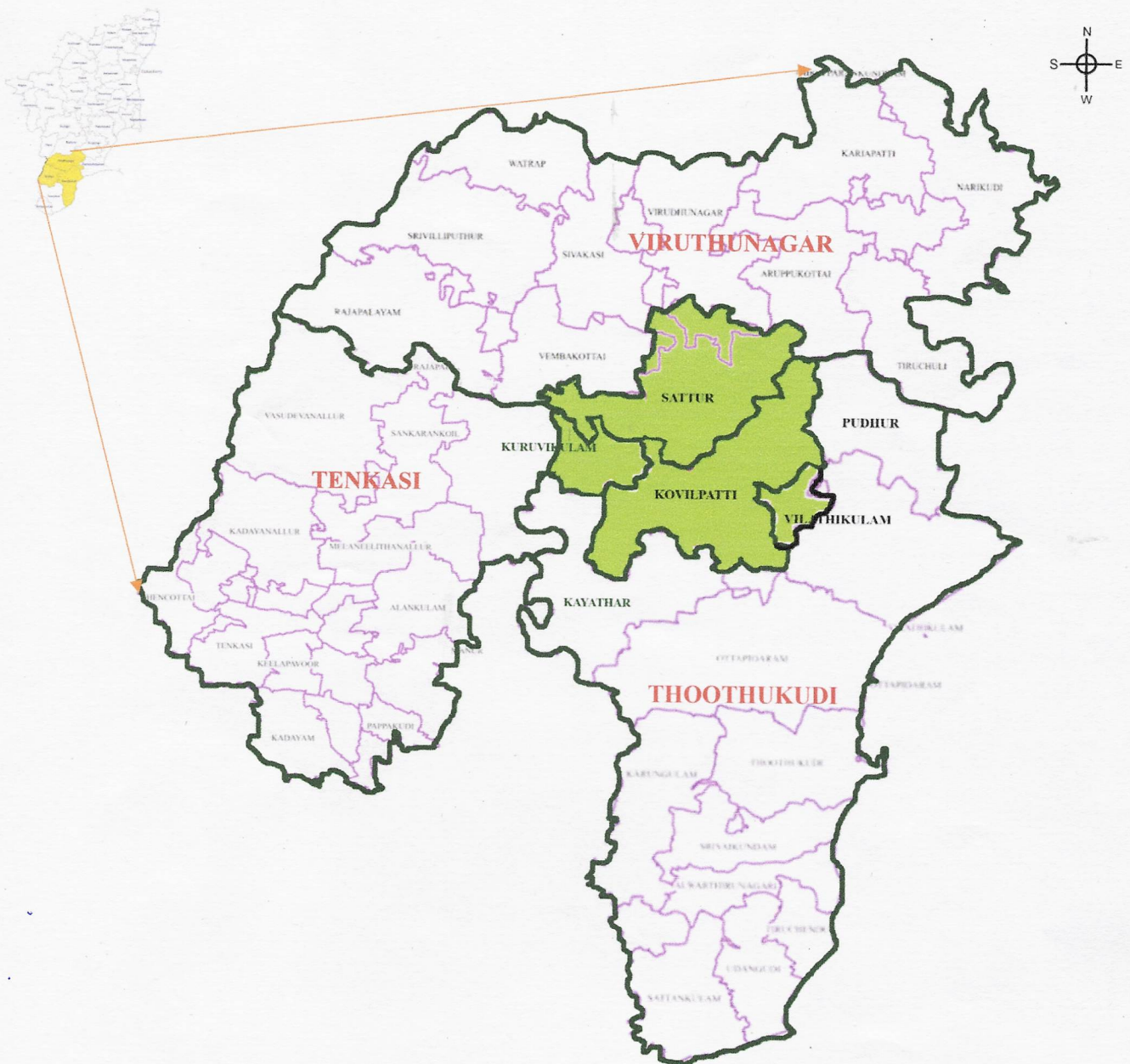
- One representative of District Collectorate, Virudhunagar, Head of the Inspection Body
- Chief Executive Officer, TANSAMB, Chennai
- Deputy Director (Agribusiness), Virudhunagar
- One member of the Co-Applicant
- District Development Manager, NABARD, Virudhunagar
- CEO, NABARD Madurai Agribusiness Incubation Forum, Madurai
- One member from Horticulture Department, Virudhunagar
- One member from Sulashana Panneer Selvam, IPR for Agriculture and Rural Development Centre (NGO)

This inspection body formed by the applicant will be acting independently to ensure the quality check upon the goods and the applicant also undertakes that the inspection body will keep the check on the quality, manufacturing, and mechanism of the goods. The abovementioned persons may constitute the inspection body.

L) Others:

VIRUTHUNAGAR SAMBA DRY RED CHILLI (SIVAPPU MILAGAI VATHAL) CULTIVATION AREA

INDIA>TAMILNADU> VIRUTHUNAGAR



Latitude: 9° 00' 15" N to 9° 25' 13" N

Longitude: 77° 11' 04" E to 77° 44' 30" E

 -Virudhunagar Samba Dry Red Chilli Cultivation Area

b. vignesh

[Signature]

4. vijay
PROFESSOR & HEAD
 DEPT OF AGRL. ENGINEERING
 GRL. COLLEGE & RESEARCH INSTITUTE
 MADURAI - 625 104

Advertised under Rule 41 (1) of Geographical Indications of Goods (Registration & Protection) Rules, 2002 in the Geographical Indications Journal 200 dated November 30, 2024

G.I. APPLICATION NUMBER – 920

Application Date: 04-07-2022

Application is made by 1. Tamil Nadu State Agricultural Marketing Board at Chief Executive Officer, Thiru Vi Ka Industrial Estate, Guindy, Chennai – 600 032, Tamil Nadu, India and 2. Chettikulam Small Onion Farmers Producer Association at No. 7/34, Kunnumedu, Post: Chettikulam, Taluk: Aalathur, District: Perambalur – 621 104, Tamil Nadu, India for Registration in Part - A of the Register of **Chettikulam Small Onion** under Application No. 920 in respect of Onion falling in Class – 31 is hereby advertised as accepted under Sub-section (1) of Section 13 of Geographical Indications of Goods (Registration and Protection) Act, 1999.

- A) Name of the Applicant :** 1. Tamil Nadu State Agricultural Marketing Board
2. Chettikulam Small Onion Farmers Producer Association
- B) Address :** 1. Tamil Nadu State Agricultural Marketing Board,
Chief Executive Officer, Thiru Vi Ka Industrial Estate, Guindy, Chennai – 600 032,
Tamil Nadu, India and
2. Chettikulam Small Onion Farmers Producer Association,
No. 7/34, Kunnumedu, Post: Chettikulam, Taluk: Aalathur, District: Perambalur – 621 104, Tamil Nadu, India a

Facilitated By:

NABARD - Madurai Agri Business Incubation Forum, Madurai

- C) Name of the Geographical Indication :**

CHETTIKULAM SMALL ONION



- D) Types of Goods :** **Class 31 – Onion**
- E) Specification:**

Chettikulam, a prominent center for small onion (shallot) cultivation, is located in the Aalathur block of Perambalur district, Tamil Nadu. The area is known for producing small onions with

superior yield, quality, and shelf life, making them highly sought after, both locally and internationally. The Chettikulam onions are distinguished by their pinkish hue, uniform size, and pungency, a result of the high sulfur content in the region's soil. These onions are notable for having 15 to 18 layers of dried outer scales, which enhance their durability and shelf life of 8 to 9 months.

The district's significance in small onion cultivation is immense, with over 8,000 hectares dedicated to the crop, producing an annual yield of 65,000 to 70,000 tonnes. This has led to Perambalur becoming a major hub for shallots in Tamil Nadu, attracting the attention of the central government, which is planning to establish a Common Food Processing Centre in Chettikulam to further bolster this thriving industry. The region plays a pivotal role in fulfilling the high demand for small onions, not only in India but also in other parts of Asia, where onions are a vital ingredient in cooking.

Chettikulam's small onions are often used as parental material for other onion-growing regions in Tamil Nadu, further highlighting the quality of the produce. The use of bulb division for propagation, as opposed to seed sowing, is a key feature in shallot cultivation. With over 12,500 hectares of onions being cultivated in Perambalur this year, the industry continues to grow, ensuring that Chettikulam remains at the forefront of small onion production.

The Chettikulam Small Onion has several distinctive morphological characteristics that set it apart from other varieties of small onions. These features contribute to its superior quality, appearance, and long shelf life, making it highly prized in both domestic and international markets. Here are the key morphological characteristics:

Color:

The Chettikulam Small Onion has a pinkish hue, which is one of its most defining features. This color adds to its visual appeal and distinguishes it from other varieties of onions.

Size:

The onions are uniform in size, typically small, with a diameter ranging from 2 to 3 cm. This consistent size is highly desirable in culinary uses where uniformity is important.

Shape:

The onions are generally round to oval-shaped and exhibit a compact bulb structure.

Pungency:

Chettikulam onions are known for their strong pungency. This heightened level of pungency is attributed to the high sulfur content found in the soil of the Chettikulam region, which contributes to their distinctive sharp taste.

Layers:

One of the key morphological traits is the presence of 15 to 18 layers of dried outer scales. This extra layer of skin provides added protection to the inner bulb, which not only enhances the onion's shelf life but also preserves its quality during storage and transportation.

Outer Skin:

The outer scales are thicker and more intact than those of many other onion varieties. This contributes to the onion's resilience and longer shelf life, typically ranging between 8 to 9 months.

Bulb Shape:

The bulb of the Chettikulam Small Onion is firm and compact, making it ideal for handling and storage.

Bulb Reproduction:

Like other small onions (shallots), Chettikulam onions primarily reproduce through bulb division rather than from seeds, allowing for the propagation of the same desirable traits across generations.

Texture:

The texture of the onion's flesh is crisp and dry, which aids in its long shelf life, making it less prone to spoilage compared to other types of onions.

Early Sprouting:

Chettikulam Small Onion exhibits early sprouting compared to other onion varieties, allowing for quicker growth and harvesting.

Plant Height:

It records the highest plant height at all growth stages, both during the Summer and Kuruvai (Monsoon) seasons, which contributes to stronger and healthier bulbs.

Bulb Parameters:

The bulbs of Chettikulam Small Onion are noted for their excellent size and shape, standing out compared to other varieties in terms of uniformity and appeal.

Shelf Life:

The Chettikulam Small Onion has superior shelf life due to the presence of more outer layers or skins. The shelf life is typically 8 to 9 months, far longer than many other onion varieties.

Germination Rate:

The germination rate of Chettikulam Small Onion is high, contributing to its use as a propagating material. Around 70% of the harvest is used as bulbs for propagation in various onion-growing regions of Tamil Nadu.

Post-Harvest Drying Process:

After harvest, a unique practice known as "Muttu kattudhal" is followed, which is an open drying process done 15 days after harvest. The harvested onions are stacked in piles, and the region's climatic conditions play a key role in increasing the shelf life of the onions.

Storage Method – "Pattarai":

Farmers in the region use a traditional storage method called "Pattarai", where onions are stored in a structure that protects them from rain and direct sunlight. The base of the Pattarai is elevated and covered with biomaterials like coconut leaves and thatches. This storage method allows the onions to be preserved for up to three months, and when stored in ventilated conditions, the shelf life is effectively doubled.

These morphological traits of the Chettikulam Small Onion make it a high-quality product, in demand for its cooking properties, shelf stability, and aesthetic appeal. The combination of these factors makes it a popular choice for both local consumption and export markets.

F) Description:

The Scientific name of small onion is *Allium Cepa. L.*, commercially grown in Perambalur District, Tamil Nadu. Perambalur is an inland district of Tamil Nadu, every year 70,000 tonnes of small onion are produced in over 12,500 hectares of land area. The onion is a round shaped horticulture crop that grows underground. It has many white layers on its inside which have a strong smell and taste. The outer skin is pinkish and has the highest pungency among other small onions. It is a crop of tropical and subtropical region which are tolerant to hot and humid tropical climate, better tolerance to pest and diseases and have longer storage life than the common onion. It is also known as small onion, underground onion, shallots, multiplier onion, nesting onions, and ever-ready onion noted for its hardiness and early maturity than the common onion. It is famous for its pungency and reproduces primarily by division of bulbs, rather than by seed.

Characteristics of Small Onion:

- ❖ The onion is round shaped: outer skin is pinkish and even in size.
- ❖ The onion is free from cuts, bruises, black/brown spots, ruptured skin and any type of damage caused by packing, pressure, handling and mechanical means.
- ❖ Free from rotting/fungal, insect and disease infestation for 4 months on certain local climatic conditions.

Scientific Classification:

Rank	Scientific Name
Kingdom	Plantae
Clade	Tracheophytes
Clade	Angiosperms
Clade	Monocots
Order	Asparagales
Family	Amaryllidaceae
Subfamily	Allioideae
Genus	Allium
Species	A.Cepa

Nutrition Value

Nutrition	In grams	Daily values per day
Calorie	29 calories	
Total fat	0.06g	0%
Saturated fat	0.018g	0%
Polyunsaturated fat	0.043g	
Monounsaturated fat	0.016g	
Cholesterol	0mg	0%
Sodium	2mg	0%
Total carbohydrate	7.08g	3%
Dietary Fiber	1g	4%
Sugars	3g	
Protein	0.64g	
Calcium	15mg	1%

Iron	0.13mg	1%
Potassium	101mg	2%
Vitamin C	4.5mg	5%

Source: Fat secret Platform | API <https://mobile.fatsecret.com>

G) Geographical area of Production and Map as shown in page no:

Chettikulam Small Onion is Cultivated in Chettikulam Village in Allathur Block in Perambalur District of Tamilnadu, India, It lies between Latitude:11.30 N Longitude:78.40 E, Altitude:98-160m. Map separately attached in Annexure A

Cultivating Areas:

Blocks: Alathur Block, Perambalur Block and other surrounding areas

S.No	Village
Alathur Block	
1	Padalur
2	Irur
3	Nattarmangalam
4	Chettikulam
5	Mavalingai
6	Thenur
7	Siruvayalur
8	Naranamangalam
9	Elanthalapatti
10	Nakka Salem
11	Kannapadi
12	Puduammappalayam
13	T.Kalathur

Perambalur Block	
1	Pommanapadi
2	Chatramanai
3	Velur
4	Kurumbalur
5	Ladapuram
6	Ammappalayam
7	Kalarampatti
8	Melapuliyur
9	Navalur
10	Aranarai
11	Esanai
12	Keelakarai
13	Sengunam
14	Elambalur
15	Perambalur

H) Proof of Origin (Historical records):

Chettikulam is a village in Alathur block located in Perambalur district. As mentioned in The Imperial Gazetteer of India published in 1908, Perambalur was a taluk in Thiruchirapalli district of Tamil Nadu State previously called as "Trichinopoly." The place where the agricultural practices had been followed effectively. The major crops grown here were Maize, Cotton, Rice, Onion.

Chettikulam is famous for the Dhandayuthapani temple which is dedicated to Hindu God Lord Murugan, commonly called Vadapalani in the region. After the harvest of small onion the people around the village is used to give some quantity for dhakshan as a token of worship.

1. **PRESS INFORMATION BUREAU, GOVERNMENT OF INDIA, CHENNAI (released on- August 31, 2017) Smt. Harsimrat Kaur Badal launches Common Food Processing Incubation Centre for Shallots, Perambalur:**

The following observation was made by the aforementioned source:

“Perambalur district is the hub for small onions (Shallots) cultivation in over 8000 hectares producing around 65,000 to 70,000 tonnes every year.”

Smt Harsimrat Kaur Badal further said that “farmers in Perambalur District are producing 70000 tons of shallots per year in a cultivation area of 8000 hectares, inspite of the increasing difficulty in cultivation due to increase in prices of inputs, unpredictable weather, disease outbreak and not getting adequate prices in the market. This Central Processing Center for Shallots in Perambalur will ensure that no shallots are getting wasted, increase farmers' income and also ensure availability of shallots to consumers. This Onion processing technology should be taken to all parts of India.”

The copy of the aforementioned published material has been attached in Annexure C.

The aforementioned source reveals the benefits and specialties of small onions being cultivated in Chettikullam.

2. **THE HINDU, Value-added shallots find ready buyers (published on- October 16, 2018):**
This article states the established procedure for the cultivation and harvest of Chettikullam small onions and the important role played by Common Food processing incubation Centre in developing Chettikullam as the most popular spot for cultivation for small onions.
Source: The Hindu (October 16, 2018).
3. **Report relating to small onion seed production programme (February 2021), programmed by Tamil Nadu Agricultural University and KVK farmers:**
The report says this programme facilitates and “helps farmers produce seeds of small onions from seed to seed and assist the district in making availability of seed material.”
4. **Visalakshi M, and 2 others, EVALUATION OF SMALL ONION VARIETIES FOR THEIR SUITABILITY IN CAUVERY DELTA REGION FROM TAMIL NADU, International Journal of Chemical Studies (published on 2018):**
This article states that due to the day-to-day abundance of small onions in Chettikullam, they were made use of in a field experiment to identify the high yielding variety in the Cauvery Delta region.
5. **S. Bharat and 3 others, A STUDY ON ADOPTION OF TNAU RELEASED SMALL ONION VARIETY CO (On)5 AMONG FARMERS OF PERAMBALUR DISTRICT, TAMIL NADU, Asian Journal of Agricultural Extension, Economics and Sociology (published in 2022):**
This article talks about the experiment conducted on the CO (On)5 variety of small onions in Perambalur due to the wide-spread availability of it.
6. **R. Parimalarangan, and 2 others, RISKS AND ITS MANAGEMENT STRATEGIES IN SMALL ONION, PERAMBALUR DISTRICT OF TAMIL NADU, Journal of Pharmacognosy and Phytochemistry (published in 2019):**

This article focuses on the various short-comings and difficulties associated with the cultivation of small onions and how Chettikullam overcame these with its management strategies.

7. SimpliCity News Team, PRICES OF SMALL ONIONS BRING CHEER FOR TN FARMERS (June 3, 2019):

This article lists the districts in Tamil Nadu which cultivate small onions. It states the characteristics of the small onions cultivated in Perambalur and the process of its production.

8. Tamil Nadu Foundation USA:

This website states that “Perambalur accounts for 24% of the small onion produced in Tamil Nadu and holds the first place in its production in the state.

9. Onion Mission IIFPT: SUCCESS STORY OF IIFPT ONION MISSION (published on August 30, 2017):

This article gives out the characteristics and specifications of small onions cultivated in Chettikullam, along with storage procedures. The article enclosed proof of origin and uniqueness for the good.

10. Tamil Nadu Agri-Tech Portal, HORTICULTURE: VEGETABLES: SMALL ONION

In this website, the procedure for cultivation and harvest of small onions is explained in detail. This information has been obtained from the authentic website of Tamil Nadu Agricultural University.

11. K.E.Lawande and P.C.Tripathi, INTERNATIONAL SYMPOSIUM OF EDIBLE ALLIUMS: CHALLENGES AND OPPORTUNITIES (published on February 9-12, 2019).

This source elucidates the storage conditions and structures along with harvest practices that is predominantly used for small onion cultivation.

In light of the above-mentioned materials and other sources, it can be inferred that the small onions from Chettikullam have been cultivated in that area since 1741.

I) Method of Production:

Botanical Name: *Allium Cepa.L*

Family: **Amaryllidaceae**

Planting Season:

Since the Perambalur district shows hot climatic condition which is suitable for Chettikulam onion cultivation. Sow the medium sized bulbs during April – May and October – November. It requires sufficient soil moisture during its growing period but heavy rains during bulb germination and bulb formation affects the crop growth.

Propagation:

Medium sized bulbs are to be chosen for planting. Bulbs @ 1000 kg/ha. The bulb consists of a short plate- like stem surrounded by a number of concentric layers of fleshy leaf bases.

Soil:

Red loam to Black Soil with good drainage facility is highly suited for onion cultivation it performs well at a soil pH range of 6-7 and mild season without extremes of heat and cold.

Field Preparation:

Plough the land to a fine tilth and form ridges and furrows at 45 cm spacing. Sow the bulb on both the sides of the ridges at 10 cm apart.

Irrigation:

Irrigate at the time of planting of seedling and third day and later at weekly intervals. Withhold irrigation 10 days before harvest.

Spacing and Planting:

Bulbs or seedlings are planted in rows of 20 cm spacing and 12 cm between plants. Planting is done at 6 rows in each bed: thereby it accommodates 55,560 plants in one hectare. Irrigation is done after transplanting or planting the bulbs. Complete wetting is necessary to maintain uniform moisture level.

Harvest:

Harvesting is done by pulling out plants when tops are drooping but still green. During hot days when soil is hard, bulbs are pulled out with a hand-hoe. The yield will be around 12-16 tha in 70 to 90 days.

Government Initiatives:

Indian agriculture needs to be supplemented with food processing and value addition for achieving the target of doubling the farmer's income. The Common Food Processing Incubation Centre (CFPIC) launched during 2017 was set up at Chettikulam village by the central government for processing of small onion to produce vacuum packed peeled onion, onion paste, onion flakes and onion powder.

J) Uniqueness:

The Chettikulam Small Onion is unique for its superior quality, high pungency, long shelf life, and excellent propagation potential. The combination of favorable soil conditions, a distinct drying process, and traditional storage methods enhances its value. These factors, along with the region's specialized farming practices, contribute to the uniqueness of Chettikulam Small Onion, making it a highly sought-after crop in both local and international markets.

Geographical Significance:

Soil:

The soil in Chettikulam is primarily red loamy and black soil, with high clay content. The soil in the surrounding blocks of Alathur, Perambalur, and Veppanthattai is deep and calcareous, with moderate alkalinity. These soils are rich in sulfur, which contributes to the high pungency of Chettikulam Small Onion, giving it its distinctive sharp flavor.

Climate:

Perambalur district lies in three main agro-climatic sub-zones: Cauvery Delta Zone, North Eastern Zone, and North Western Zone. The region experiences hot climatic conditions, particularly from April to June, with temperatures reaching their peak during these months. January and February are cooler months. The generally dry weather helps improve the shelf life

of onions, especially with the application of traditional cultural practices such as drying and specific storage methods.

Rainfall:

The district receives an average rainfall of 908 mm, slightly less than the state's average of 946.9 mm. The majority of the rainfall (52%) occurs during the Northeast Monsoon (October to December), with 35% during the Southwest Monsoon (June to September). The remaining rainfall is distributed during winter and summer months. Given the region's low rainfall, sowing is timed to align with available rainfall, and harvesting is carefully managed to minimize post-harvest losses.

These geographical and environmental factors—such as soil composition, climatic conditions, and rainfall patterns—play a significant role in the growth, quality, and unique characteristics of the Chettikulam Small Onion. The combination of these natural conditions and traditional practices makes Chettikulam a leading region in small onion production, known for its high-quality yield and superior shelf life.

Human Skill

Post-Harvest Drying Process:

After harvest, a unique practice known as "Muttu kattudhal" is followed, which is an open drying process done 15 days after harvest. The harvested onions are stacked in piles, and the region's climatic conditions play a key role in increasing the shelf life of the onions.

Storage Method – "Pattarai":

Farmers in the region use a traditional storage method called "Pattarai", where onions are stored in a structure that protects them from rain and direct sunlight. The base of the Pattarai is elevated and covered with biomaterials like coconut leaves and thatches. This storage method allows the onions to be preserved for up to three months, and when stored in ventilated conditions, the shelf life is effectively doubled.

The Chettikulam Small Onion stands out for several unique features that distinguish it from other onion varieties, both in terms of its physical characteristics and its cultivation practices. Here are the key factors that contribute to the uniqueness of the Chettikulam Small Onion:

1. Superior Quality and Pungency

High Pungency: The Chettikulam Small Onion is known for its intense pungency, which is significantly higher than that of other varieties. This is due to the region's high sulfur content in the soil, giving the onion its sharp flavor, which is highly valued in cooking.

Distinctive Appearance: The onion has a pinkish hue and a uniform size, which enhances its appeal both visually and in terms of marketability. Its round to oval-shaped bulbs are firm and compact.

2. Long Shelf Life

One of the most remarkable features of Chettikulam Small Onion is its extended shelf life. The onion is known to last up to 8 to 9 months, significantly longer than other onion varieties. This extended shelf life is due to the onion's multiple layers (15 to 18 layers of outer skin) that protect the inner bulb, preserving its quality for extended periods.

3. High Germination Rate and Propagation

The Chettikulam Small Onion has a high germination rate, making it a preferred variety for propagation. Around 70% of the harvested produce is used as propagating material (bulbs) in

other onion-growing regions of Tamil Nadu. This makes the variety especially valuable for sustaining the onion-growing industry in the region.

4. Unique Post-Harvest Drying Process ("Muttu Kattudhal")

After harvesting, a unique drying practice called "Muttu Kattudhal" is followed. About 15 days after harvest, onions are arranged in piles for an open drying process. The region's dry and hot climatic conditions play a crucial role in enhancing the onion's shelf life during this process. This traditional method, passed down through generations, is essential for preserving the onions and improving their quality.

5. Traditional Storage Method ("Pattarai")

Farmers use the "Pattarai" method to store onions, a traditional and eco-friendly storage system. The onions are stored in an elevated structure, usually covered with coconut leaves, thatches, or bamboo, which protects the onions from the sun and rain. The ventilated storage structure allows onions to be stored for up to three months, and this duration increases with the use of proper ventilation, making it ideal for storing onions until market prices are favorable.

6. Unique Soil and Climate Conditions

The soil in Chettikulam is rich in sulfur, which contributes to the onions' unique pungency. The region's red loamy and black soils, combined with its moderately alkaline nature, provide the ideal conditions for cultivating high-quality small onions.

The climate in Perambalur, characterized by hot temperatures and relatively dry weather, is another key factor in the uniqueness of the Chettikulam Small Onion. This climate helps in improving its shelf life, making it more durable compared to onions grown in more humid conditions.

7. High Demand and Export Value

Due to its superior quality, pungency, and shelf life, Chettikulam Small Onion has high domestic and international demand. It is not only popular in South India but also exported to various parts of the world, particularly in Asian countries where small onions (shallots) are a staple ingredient in cooking.

8. Role in Regional Propagation

The Chettikulam Small Onion serves as parental material for onion cultivation in other regions of Tamil Nadu. Its high-quality bulbs are used to propagate future crops, ensuring that the genetic traits of this variety are maintained and spread across the state.

K) Inspection Body:

In the future, the inspection body will be formed which may be constituted by the below-mentioned persons to keep a check on the quality of the products.

1. One Representative from District Collectorate, Perambalur,
2. Chief Executive Officer, TANSAMB, Chennai
3. Deputy Director (Agribusiness), Perambalur
4. District Development Manager, NABARD, Perambalur
5. CEO, NABARD Madurai Agribusiness Incubation Forum, Madurai
6. One member from Horticulture Department, Perambalur
7. One member from the Co-Applicant

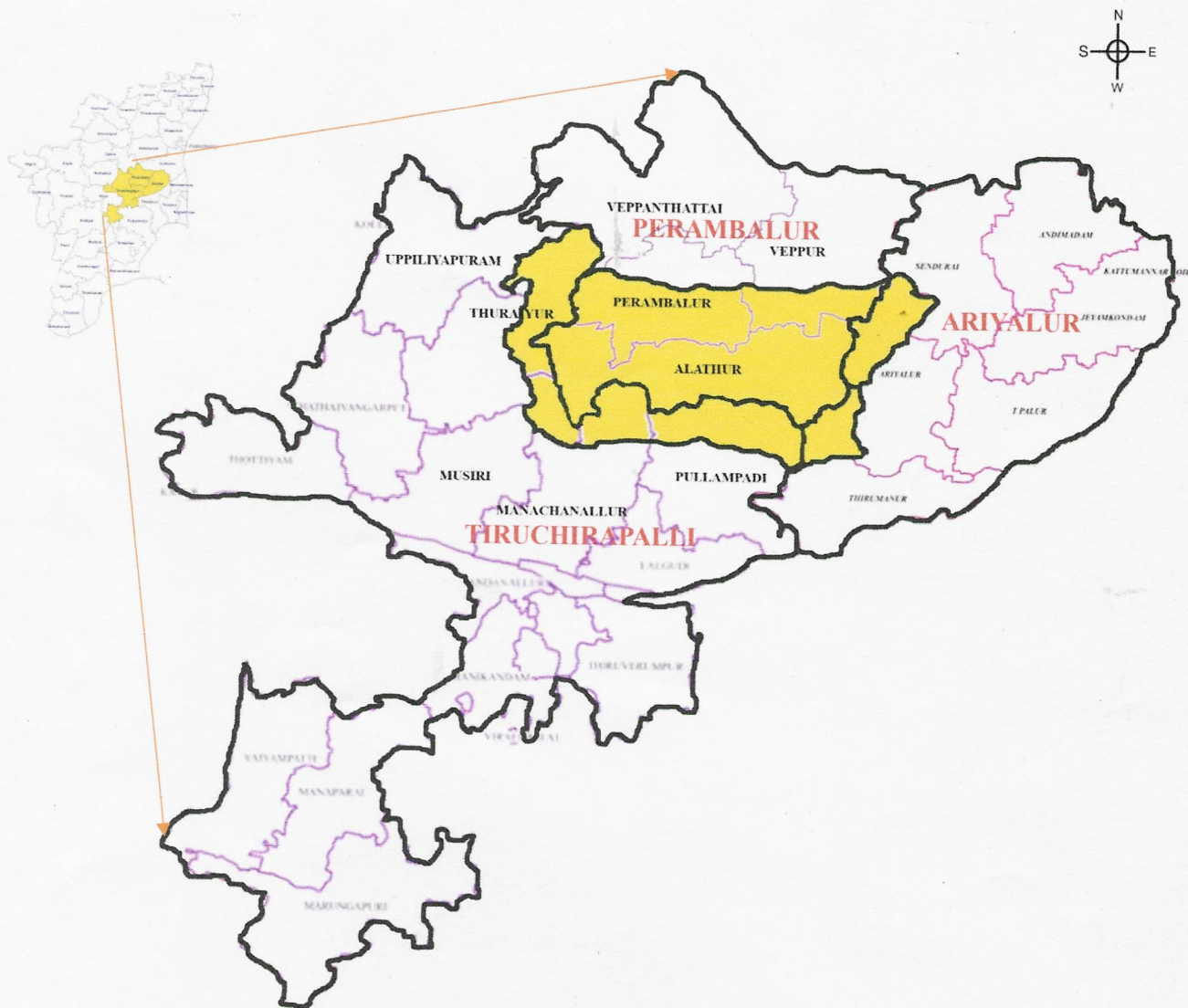
8. One member Indian Institute of Food Processing Technology, Thanjavur.
9. One member from Sulashana Panneer Selvam, IPR for Agriculture and Rural Development Centre (NGO)

This inspection body formed by the applicant will be acting independently to ensure the quality check upon the goods and the applicant also undertakes that the inspection body will keep the check on the quality, manufacturing, and mechanism of the goods. The above-mentioned persons may constitute the inspection body.

L) Others:

CHETTIKULAM SMALL ONION (CHINNA VENGAYAM) CULTIVATION AREA

INDIA>TAMILNADU> PERAMBALUR



Latitude: 11° 03' 27" N to 11° 13' 06" N

Longitude: 78° 39' 02" E to 79° 04' 31" E



-Chettikulam Small Onion Cultivation Area

S. Vignesh

[Signature]

H. [Signature]
PROFESSOR & HEAD
 DEPT OF AGRL. ENGINEERING
 ARL. COLLEGE & RESEARCH INSTITUTE
 MADURAI - 625 104

G.I. APPLICATION NUMBER – 927

Application Date: 19-07-2022

Application is made by 1. Unarvu Pattikavargha Vividodesha Sahakarana Sangam at 710, Post: Venmani, Palaplavu, District: Idukki – 685 606, Kerala, India and 2. Vanasree Bamboo Craft & Vanavibhava Shekarana unit at Post: Moolakkad, Uppukunnu, District: Idukki – 685 595, Kerala, India for Registration in Part - A of the Register of **Kannadippaya (Bamboo Mat)** under Application No. 927 in respect of Kannadi falling in Class – 20 & 27 is hereby advertised as accepted under Sub-section (1) of Section 13 of Geographical Indications of Goods (Registration and Protection) Act, 1999.

- A) Name of the Applicant :** 1. Unarvu Pattikavargha Vividodesha Sahakarana Sangam
2. Vanasree Bamboo Craft & Vanavibhava Shekarana unit
- B) Address :** 1. Unarvu Pattikavargha Vividodesha Sahakarana Sangam at 710, Post: Venmani, Palaplavu, District: Idukki – 685 606, Kerala, India and
2. Vanasree Bamboo Craft & Vanavibhava Shekarana unit at Post: Moolakkad, Uppukunnu, District: Idukki – 685 595, Kerala, India

Facilitated By:

KSCSTE - Kerala Forest Research Institute

- C) Name of the Geographical Indication :**

KANNADIPPAYA (BAMBOO MAT)



- D) Types of Goods :** **Class 20 & 27 – Kannadi**

- E) Specification:**

Kannadippaya (bamboo mat) is a beautifully crafted traditional bamboo mat, woven by certain tribal communities of Kerala with unique “*kannadi*” design and is a pride item of the tribespeople. *Paya* is the Malayalam vernacular for ‘mat’ and ‘*kannadi*’ is the unique square design woven on the mat. *Kannadippaya* is mainly woven by five ethnic groups viz. *Oorali*, *Mannan*, *Muthuva*, *Malayan* and *Kadar* tribes mainly from Idukki, Thrissur, Ernakulam and

Palakkad districts of Kerala. Other indigenous communities including *Ulladan*, *Malayarayan*, and *Hill pulaya* are also engaged in its weaving to a lesser extent.

'Square' is the basic design element (*kannadi*) that is repeated across (almost) all the varying weaving designs and dimensions of '*kannadippaya*'. The design over a mat could be varying from repetition of small simple squares to a highly ornamented and complex looking squares all arranged in lines and rows; sometimes diagonal designs of squares are also adopted. The choice of design is left to the artisan.

This traditional mat is woven using slivers made out of reed bamboo (thin-walled bamboo), collected from the forests in the Western Ghats. The beauty and health benefits of this natural sleeping mat are unparalleled. It is famous for its unique "*kannadi*" designs, softness, appealing craftsmanship and light refractive properties. The square designs woven uniquely on this mat in different patterns are called "*kannadi*". Each *kannadi* (square) and its surrounding warps and wefts on the mat impart it a unique appearance and beauty. Another distinct feature is that a well-finished *kannadippaya* reflects light differently, due to unique arrangements of warps and wefts creating different designs when viewed from different angles. Designs become more clear and more visible with a slight change in the plane of view. Border designs of the mat are also unique and very attractive. For most luxury mats along with *kannadi* designs, designs of trees, animals and birds are also made along the corners.

There are different names for *kannadippaya* according to the arrangements of squares on a mat, like "*ottakkannan*" or "*anachevidan*" ("*otta*" means one; single square design), "*randu vari*" (two squares in a row; *randu* means two and *vari* mean row) "*moonnu vari*" (three squares in a row; *moonnu* means three), "*naluvani*" (four squares in a row; *nalu* means four), "*padakkanan*" (like King and soldiers) "*nandupaya*", etc. (Designs given in Annexure 1). Community members generally use this mat as a sleeping mat. Other utilitarian and craft items like prayer mats, small sitting mats, table mats, baskets, *murams* (winnowing pans), drying mats, curtains, yoga mats, wall hangings, table mats etc. are also made with reed to cater to consumer needs and sustain livelihood security of producer communities. Unique *kannadi* designs will be crafted on these items. The members of the tribespeople craft these items for their occasional household use, selling and also for gifting to dignitaries.

The size of mats varies depending on the purpose. Normal sleeping mats may have a size of 6x3 feet or 6x4 feet, yoga/ prayer mats may have a size of 5.5x2 feet, and table mats and wall hangings normally may come to 30-35 x 30-35 cm or as per the need of the customer.

Fine quality *kannadippaya* is made of slivers from reed bamboo (thin-walled bamboo). *Njoonjileetta/ njoojoora/ ponneetta/ meieeta/ neytheetta* are the colloquial names of the reed bamboo [*Teinostachyum wightii* Bedd.] used for weaving mats. *Ochlandra sp.*, known as *kareetta, pereetta, velleeta, chitoora, kanjoora* are also used in weaving *kannadippaya*, basket wares and handicraft items with *kannadi* designs. The slivers from *Teinostachyum wightii* Bedd. have more length and flexibility, making them ideal for making fine quality and durable *kannadippaya*. These reed species are distributed in the forests of the Western Ghats. It grows gregariously in the interior of forests along perennial or semi-perennial streams on sloppy lands.

Culms of appropriate maturity are selected for weaving *Kannadippaya* to ensure flexibility. Slivers are extracted from culms and then sun-dried. Mainly the fourth & fifth sliver starting from the inner hollow is used in mat weaving. Fine slivers may have a length of 70-80 cm, a width of 0.4-0.5 cm, and a thickness of 1.0 mm. The slivers are polished and smoothened by pulling them beneath a sharp knife after placing them over a cloth piece. The smoothness and

flexibility of the mat are enhanced by the smoothening of slivers which enhance the beauty of the mat. *Kannadippaya* is unique with its natural colour of bamboo slivers.

Kannadippaya and bamboo mat products are highly eco-friendly. *Kannadippaya* like any other natural mat, have health benefits as it gives warmth in the cool-season and cool feeling in the summer season.

F) Description:

Kannadippaya (bamboo mat) is one of the unique bamboo mats woven by tribal communities. The square designs woven uniquely on this mat in different patterns are called “*kannadi*” and *paya* is the Malayalam vernacular for ‘mat’. This mat, fully natural, is hand woven mainly by women without using machinery. The traditional weaving skill is inherited from older generations. *Kannadippaya* is well-known for its smoothness, flexibility, appealing beauty and “*kannadi*” designs making it a unique tribal craft item. A well-finished *kannadippaya* reflects light differently due to arrangements of warps and wefts, creating different designs when viewed from different plains. Border designs of the mat are also unique and very attractive. For most luxury mats along with *kannadi* designs, designs of trees, animals and birds are also made along the corners.

Community members generally use this mat as a sleeping mat. The members of the tribespeople craft these items for their occasional household use, selling and also for gifting to dignitaries. Utilitarian and craft items like prayer mats, small sitting mats, table mats, baskets, *murams* (winnowing pans), drying mats, curtains, yoga mats, wall hangings, table mats *etc.* are also made with reed to cater to consumer needs and sustain livelihood security of producer communities. Unique *kannadi* designs will be crafted on these items.

There are different names for *kannadippaya* according to the arrangements of squares on it, like “*ottakkannan*” or “*anachevidan*” (single square design), “*randu vari*” (two squares in a row), “*moonnu vari*”, *naluvayi*, *nandupaya*, *padakkannan* *etc.* Bigger mats may have more than 60 small squares arranged beautifully.

The size of mats varies depending on the purpose for which it is woven and according to consumer demand. A normal sleeping mat may have a size of 6x3 feet or 6x4 feet, a yoga/prayer mat may have a size of 5.5x2 feet, a table mat and wall hangings may come to 30-35x 30-35 cm or according to the customer's need. Baskets may have different sizes and shapes, but all with *kannadi* designs. The overall attraction of the mat is decided by the careful processing, choice and deployment of slivers used in weaving. Manual skill, acquired from elderly people adds to the quality of the product.

This traditional *kannadippaya* is woven using slivers from reed bamboo (thin-walled bamboo) abundant in forest tracts in the Western Ghats. The beauty and health benefits of this fully natural hand-woven sleeping mat ensure good market demand especially in this era of ‘nature living’.

Fine quality *kannadippaya* are made of slivers from reed bamboo locally known by different colloquial names such as *njoonjileetta* / *ponneetta/njoojoora/meieeta/ neytheetta* [*Teinostachyum wightii* Bedd.]. *Kareetta*, *pereetta*, *velleeta*, *chitoora*, *kanjoora* belonging to *Ochlandra* *sps.* are also used in mat making. Slivers are extracted from culms and then sun-dried. Mainly the fourth & fifth sliver starting from the inner hollow is used in mat weaving. Fine slivers may have a length of 70-80 cm, a width of 0.4-0.5 cm, and a thickness of 1.0 mm. The

slivers are polished and smoothened by pulling them beneath a sharp knife after placing them over a cloth piece. The smoothness and flexibility of the mat are enhanced by the smoothening of slivers which enhance the beauty of the mat. *Kannadippaya* is unique with its natural colour of bamboo slivers.

G) Geographical area of Production and Map as shown in page no:

Kannadippaya weaving is mainly practiced by the *Oorali*, *Mannan*, *Muthuva*, *Malayan* and *Kadar* tribal communities residing in Idukki, Thrissur, Ernakulam, and Palakkad districts of Kerala. Other tribal groups including *Ulladan*, *Malayarayan* and *Hill pulaya* are also engaged in its weaving to a lesser extent.

Area specification: The production area lies between 09° 00' to 11° 20' North latitudes and 76° 0' to 77° 30' East longitudes and is in the central and southern part of Kerala and along the Western boundary of Tamil Nadu State. It is bound by Malappuram district in the north, Pathanamthitta district in the South, and the Kottayam, Alapuzha districts, and the Arabian Sea in the West.

H) Proof of Origin (Historical records):

The history of *Kannadippaya*, a traditional tribal mat, is deeply rooted in the culture and traditions of the indigenous communities in Kerala. In the Pre-colonial era *Kannadippaya* mats have been an integral part of tribal life for centuries, with evidence of mat weaving dating back to ancient times. Later, introduction of commercial mats led to a decline in the demand for traditional *Kannadippaya* mats. However, the tribals continued to weave mats for their own use, preserving their traditional techniques and designs. The communities traditionally use *Kannadippaya* in their cultural festivities. There is representation of this craft item in the tribal songs and documentaries prepared by various agencies. Some communities use it as a gift item to newly wedded couples and dignitaries. It is also used as a sleeping mat for newborn babies. It is used in the traditional exortion (*mantarvadam*) process of some tribal communities.

Some historical documents related to *Kannadippaya* are given below

1. Lushington, A. W. 1915. Vernacular list- Trees, shrubs and woody climbers in the Madras Presidency. Volume II B. Printed by the Superintendent, University Press, Madras. p. 41.
Lushington, in this book described trees, shrubs and woody climbers seen in Madras presidency. He listed "*meieetta*" as *Teinostachyum wightii*.
2. Iyer, L.A., 1939. *Travancore tribes and castes*. Vol. II. Government Press, Trivandrum. p. 41.
Living as the *Muthuvans* do in the high forest where cane and reed abound, they have attained a certain measure of proficiency in making fine articles out of them. They make mats, baskets, and sieves out of reeds (*Ochlandra travancorica*) and sell them to the people of the plains. Those are made by women. Men make rattan boxes. The cane is well seasoned before it is used.
3. Ehrenfels, U R., 1952. *Kadar of Cochin*. University of Madras.p. 85
Three bundles of pai (bamboo-mats), collected from the jungle and manufactured by the women of the house, for whom they will be sold, in the plains, by male members of the family.
4. Census of India 1961, Volume VII - Village Survey Monograph of tribal area – Part VI H (1974), Page – 120
"All that the Mannans possess in the name of furniture are some reed mats of their own make. The pleasing hospitality displayed by the Mannans, when they offer a reed mat to

guests, no matter even when they are strangers, is suggestive of their traditional etiquettes.”

Page – 122

“The male and the female were asked to roll themselves on a piece of mat, starting simultaneously from both ends. The position when they collide with each other was noted, and the divination was made based upon that.”

Page – 123

“The couple sit on a reed mat in the presence of elders.”

Page – 124

“The dead body is then covered in a reed mat, and is placed on a bier made of reed and leaf of reeds.”

“Over the corpse but within the pit, they erect a covering using reed and reed leaves.”

Page – 135

“The tribes are known to have some peculiar skill in basketry, and mat weaving. Most of the households undertake this in their own limited way. The raw material used for this is reed. The tools are simple, and consist not more than a few sharp knives to cut the reeds into strips and to smoothen it. They make mats and baskets of beautiful designs. The source of design is obviously their own skill and aptitude towards this work. ‘The peculiarity of this item of activity is that it is not satisfactorily remunerative for all the labour it requires. Reed is not easily obtainable now and it has to be cut and brought from the core of the forests. Further, they are slow at this work and they require a good lot of time for finishing a product. Unfortunately, these finished products never command a value commensurate with the labour and time involved in their manufacturing. Therefore, these tribes never manufacture these articles with the intention of selling them in the markets. However, some time they manufacture these articles on specific (and satisfactory) orders from those who want it. The mode of transmission of skill in manufacturing these articles has been from elders to youngsters, through practical instruction. But now as this is not a lucrative enterprise, the tribes naturally grow less enthusiastic and interested in the ‘transmission, of skill to others. Normally these people get some orders for these articles during festive seasons, like Onam, Vishu, Christmas etc.”

5. Census of India 1961, Volume VII A – Selected Crafts of Kerala – Part VII A (1964), Mats, baskets, sieves, trays and suit-cases are some of the important articles that are produced in the State from reed. Attractive pieces of work with novel designs are largely found in Alwaye taluk in the Ernakulam district
6. Kanchiyar Rajan and V. B. Rajan (eds.).2000. *Idukkiyile gotrakalakalum samskaravum* (Tribal arts and culture in Idukki district) (Malayalam). Published by Idukki District Panchayath.2000. pp.43&44.
This book describes about *kannadippaya*, its uniqueness and its method of production.
7. Jayakumar, K.P., 2001, *Koothupattu: Vazhiyum Porulum* (in Malayalam). Dissertation submitted in partial fulfilment to the award of Master of Arts in Malayalam at the School of Letters, Mahatma Gandhi University, Kottayam, Kerala, p.13.
8. Chandra Mohanan S R (2012). *Idukki Aadivaasippaattukal* [Tribal songs of Idukki], DC Books, Kottayam Kerala, pp 59.
Translation:
This song is about the efforts of a *Muthuva* girl who wove a *Kannadippaya* for her fiancé. Ignoring her efforts the man marries another woman. Devasted; the girl burns the mat she painfully crafted for him
9. Mathirappally Manoj. 2013. *Keralathile Adivasikal: Kalayum Samskaravum* (Malayalam) [Indigenous People of Kerala: Art and Culture], DC Books, Kottayam, Kerala. p.275&276.
This book talks about *Kannadippaya* weaving tribal groups and the art and craft behind it.

10. Kanchiyar Rajan, 2011. *Athijeevanathinte gotrapadangal* (Malayalam), Z library, Thiruvanthapuram.p109,110.
The book describes about Kannadippaya and its weaving.
 11. Anitha,V., Muraleedharan P. K., Sankar, S. and Seetha Lakshmi .K. K. 2012. Role of bamboo in sustainable livelihood in S. India. KFRI Research Report No.480. Kerala Forest Research Institute, Peechi.
This report has cited the kannadippaya as a traditional luxury mat used in Kerala.
 12. Manjusha K. A. 2013. Lights and shadows of tribal development in Kerala: a study on the Muthuvan tribe of Edamalakkudy tribal settlement in Idukki district, The Dawn Journal, Vol. 2, No. 1, January - June 2013. P.279.
The article tells that members of the *Muthuva* community are rich in skills in creating unique bamboo mats and handicrafts items with various designs which was unknown to the outside world. Their mats are so nice that one can sleep on it and if properly kept, it could be used for a very long time. They call the mat “Kannadipaya” (mirror mat) due to its nice surface. Muthulakshmi, a skilled artisan in this field said that the new generation is not interested in learning the skill from the elders. As alternative items are available, the making of the handicraft items are slowly disappearing.
 13. Jayakumar, K.P.,2014, *Kudiyetta Akhyangngalile High range: Charithra Sahithya Padangngal* (in Malayalam), (Translation: High range in migrant narratives: A study on history and literature), Doctoral Dissertation submitted to Mahatma Gandhi University, Kottayam, Kerala, P. 71.
 14. Vaisakh Hari. 2015. “First ever tribal branded product released in state”. The New Indian Express - 24 August 2015.
The article reported that Malakkappara Tribal grama sabha released the state’s first ever tribal branded product of Kadar community including Kannadippaya, which is the product with most demand.
 15. George, Barsilla. 2018. Development Interventions, Socio-Cultural Change and Impact, Tribal Arts And Special Features. The Case of Muthuva Tribes of Eranakulam District, Kerala. *In Tribal Art and Society: Challenges and Perspectives*, K.S.Pradeep Kumar (Ed.), The Kerala Institute for Research Training and Development Studies of Scheduled Castes and Scheduled Tribes (KIRTADS) Kozhikode, Kerala .p. 107.
The article tells that Muthuvans are rich in skills in creating the unique bamboo mats and handicrafts items with various designs which was unknown to the outside world. Their mats are so nice that one can sleep on it and if properly kept, it could be used for a very long time. They call the mat “*Kannadipaya*” (mirror mat) due to its nice surface.
 16. Suresh S., Rajesh S and A. P. Pradeep kumar.2018. History and development of Devikulam High range, Idukki district, Kerala. *Heritage: Journal of multidisciplinary studies in Archaeology*,69(2018):697-711.
This document is about history and development of Devikulam High range, Idukki district, Kerala. It tells about etta (*Ochlandra travancorica*) used for making handicraft items and other household items including mat with various design by Muthuvans. Mat making is a highly skilled craft. Special bamboo of particular maturity are selected for making kannadippaya. They call it as kannadippaya due to its smooth surface.
- Recent articles
17. Sudha Nambudiri 2021.A mat awaits GI tag boost. Article in The Times of India, July 10, 2021.
The article narrates the story of making kannadippaya and the ambition of tribespeople to protect this unique product as a GI tagged craft item.
 18. Raghu A. V. and Syam Viswanath .2021. Kannadippaya – role of Geographical Indication in brand making and conservation. *Current Science*, Vol. 121. No.1. 10 July 2021.pp 19-20.

19. This article narrates the unique qualities and characteristics of kannadippaya, its method of preparation, importance of conservation, skill inherited by tribal communities and the biological material (reed) used for its weaving. The article also suggests the need for registration of kannadippaya as a Geographical Indication for protecting its heritage.
20. Kanne madangaruth kannadippaya kandal" Malayalam article in Malayala Manorama daily. November 6, 2021
21. Giji K. Raman 2021. "Rare mat made in the Ghats vies for a special tag". The Hindu, November 13, 2021
22. Kannadippaya Bhaumasoochika padavi: Orukkangalayi article in Malayala Manorama Daily, 18 May 2022.

I) Method of Production:

Kannadippaya is a unique bamboo mat produced by tribespeople, mainly from the *Mannan*, *Muthuva*, *Oorali*, *Malayan*, and *Kadar* communities of Kerala. It is also rarely woven by members of other tribal groups including *Ulladan*, *Malayarayan* and *Hill pulaya*. This craft fully depends on the skill and traditional knowledge of tribal artisans. Mainly elderly women are engaged in this time-consuming strenuous craft work. The skill for weaving of *kannadippaya* is orally passed from generation to generation. This mat is fully handmade using traditional skills and knowledge. Other than sleeping mats, items like sitting mats, prayer mats, curtains, different types of baskets, and muram (winnowing structures), drying mats, baby play mats are also made with reed, all with kannadi designs.

Reeds used for weaving *Kannadippaya*

Kannadippaya is hand woven with slivers from reed bamboo (thin-walled bamboo), without the use of machinery. In Malayalam reed is called as "eetta". Mannans call "eetta" as "oora". Fine quality *kannadippaya* is made of slivers from reed bamboo, locally called *njoonjileetta/ponneetta/ njoojooru /meieeta/ neytheetta* [*Teinostachyum wightii* Bedd.] an arborescent bamboo reed grown along the river banks and hill slopes in the Western Ghats in Kerala. This reed is seen in the interior of forests. Since this type of reed has long internodes (about 2 meter), the requirement for joining the slivers is reduced in mat weaving. *Kannadippaya* is also made with *Ochlandra* sp. known locally as *kareetta (karoora)*, *pereetta*, *neerura*, *velleetta (vellura)*, *chittoora* are also used for making *Kannadippaya*.

Salient characteristics of reeds used in weaving:

- a. *Teinostachyum wightii* Bedd.
Perennial; caespitose; shrubby or arborescent; culms. Rhizomes sympodial; pachymorph; short-necked. Culms erect; apically whip-like and strongly arching; dense with closely packed clumps; hollow; 10-12 m tall. Culm-internodes 30-50 cm long; 2.5-3.8 cm diameter; rough; cylindrical; pale green; having a white band towards the summit. Culm- nodes not swollen; the sheath scar prominent; girdle, or ring conspicuous; a single branch bud present enclosed in a prophyllum. Branches arise from the 5th or 6th node; the central primary branch dominant; lateral branches 2, or 3; additionally, 20-25 branches develop to form a cluster; the primary branch elongates, become whip-like; intravaginal. Culm-sheath 15-40 cm long; 6-18 cm wide at base; glabrous; coriaceous; covered with scattered appressed black hairs, when young; smooth and striate, when old; apex truncate; acuminate; auricle absent. Culm-sheath ligule, inner membranous; entire; 0.1-0.2 cm high; fimbriate. Culm-sheath blade reflexed; long; narrow; linear-lanceolate; striate; sparsely hirsute. Leaves arise on branches. Leaf-sheath overlapping; glabrous; striate; auricle and oral setae absent. Leaf-sheath ligule, inner very short; outer, not prominent. Leaf-blade lanceolate; 8-32 cm long; 1.5-4.5 cm wide; dorsal side glabrous; ventral side with minute

silky pubescence; midrib prominent on the lower side; margins scabrous; apex acuminate; scabrous; base attenuate to a short petiole.

b. *Ochlandra* sps.

Perennial; caespitose, gregarious. Rhizomes sympodial; pachymorph; solid; short – necked; covered with scales. Culms erect; 4-10 m tall; hollow, tip slightly arched, or sometimes whip like; close packed and impenetrable. Culm-internodes 0.5-1.2 m long, 4-6 cm in diameter; dark green; smooth below and rough towards the apex. Culm-nodes slightly swollen; sheath scar and nodal ridge prominent; a single nodal bud enclosed in a prophyllum. Branches arise from the fifth or sixth node; the young branches from just above the sheath scar; intravaginal; the primary central branch dominant; numerous lateral branches arise from basal buds. Culm sheaths coriaceous; 15-26 cm long; 8-12 cm wide at base; covered with bulbous based golden-brown hairs, when young; smooth, or sparsely hirsute; deciduous and striate, when old; truncate at the apex, inner side smooth and shining; auricle short, inconspicuous, ornamented with numerous stiff bristles. Culm-sheath ligule, inner 0.2-0.3 cm high; outer ligule inconspicuous. Culm-sheath blade reflexed; glabrous; subulate; 5-12 cm long; 0.6-1.2 cm wide at base. Leaves arise on branches. Leaf-sheaths overlap; closely attached; smooth; striate; auricle very short and oral setae at the apex; oral setae deciduous, when old. Leaf-sheath ligule short. Leaf blade linear-lanceolate; 19-40 cm long; 2-6 cm wide; glabrous on both sides; margins rough and scabrous; midrib prominent; clear on the lower side; apex acuminate; setaceous; scabrous and sometimes twisted; truncate at the base into a short, thick petiole. (Muktesh Kumar).

Ochlandra travancorica has the largest fibre length up to 9 mm. The fibre studies have shown a slenderness ratio 148.7, flexibility ratio 81.6 and Runkel ratio 0.9. The average chemical composition of culms (oven-dry) is as follows: cellulose, 61.8, lignin 26.9, pentosan 17.8, hot water solubles 5.1, ash 2.6 and silica 2.1 per cent. Pulping tests have shown that among the Indian bamboos, this species gives the maximum yield of pulp (unbleached, 48.3 per cent; bleached 45.8 per cent). Analysis of bleached pulp yielded 32 per cent by the water prehydrolysis sulphate process; followed by multi- stage bleaching and refining gave the following values; cellulose 96.9, pentosans 4.1, ash 0.11 per cent; iron 33 ppm; copper 0.7 per cent; cuprammonium viscosity 13.9 cp, bleaching degree 85.2 per cent, GE (General Electric Brightness Tester) and filtration factor of viscose prepared from pulp 330. Spectral absorbance value recorded for cellulose was 0.277 and for lignin 0.239.

Morphological characters of *Teinostachyum* and *Ochlandra* are given below:

Characteristic	<i>Teinostachyum wightii</i>	<i>Ochlandra</i> sps.
Culm	Erect; 10-12 m tall, hollow, apically whip-like and strongly arching.	Erect; 4-10 m tall; hollow, tip slightly arched, sometimes whip like.
Internodes	0.5- 1.8 m long; 2.5-3.8 cm diameter; rough; cylindrical; pale green; having a white band towards the summit.	0.5-1.2 m long, 4-6 cm in diameter; dark green; smooth below and rough towards the apex.
Culm-nodes	Not swollen; with prominent sheath scar; girdle, or ring conspicuous; a single branch bud present enclosed in a prophyllum.	Slightly swollen; sheath scar and nodal ridge prominent; a single nodal bud enclosed in a prophyllum.

Culm-sheath	Coriaceous 15-40 cm long; 6-18 cm wide at base; covered with scattered appressed black hairs, when young; smooth and striate, when old; apex truncate; acuminate; auricle absent.	Coriaceous; 15-26 cm long; 8-12 cm wide at base; covered with bulbous based golden brown hairs, when young; smooth, or sparsely hirsute; deciduous and striate, when old; truncate at the apex, inner side smooth and shining; auricle short, inconspicuous, ornamented with numerous stiff bristles.
Culm-sheath blade	Reflexed; long; narrow; linear-lanceolate; striate; sparsely hirsute.	Reflexed; glabrous; subulate; 5-12 cm long; 0.6-1.2 cm wide at base.
Leaf-sheath	Overlapping; glabrous; striate; auricle and oral setae absent. Leaf-sheath ligule, inner very short; outer, not prominent.	Overlapping; closely attached; smooth; striate; auricle very short and oral setae at the apex; Leaf-sheath ligule short.
Inflorescence	Large spicate panicle; terminal; drooping; on short leaf less branches; clustered.	Inflorescence a large compound spicate panicle on leafy branches.
Flower	Stamens 6 in number; filaments free; short. Style 1.2-1.5 cm long. Stigma 3 numbers	Stamens number vary from 65-130; yellow; filaments free; long; filiform. Anthers basifixed, 1.6-2 cm long; apiculate; apex ciliate. Ovary glabrous; rounded at the base and gradually elongated into a, perigynium. Style 3.8- 4.7 cm long. Stigmas 6; plumose.
Fruit	Fruit is a Caryopsis; small, glabrous; ovoid, short - beaked.	Fruit is Bacca type; large; fleshy; ovate-oblong; 8-9.5 cm long; 2.8-3 cm diameter; pericarp fleshy; glumes persistent.

a. Collection of raw material:

Tribal men and women are involved in mat weaving. Both men and women go and collect reeds from the interior forests. Following traditional knowledge, the collection of reeds is done considering lunar cycle (*pakkam*), mainly during the last days of the new moon phase and starting days of the full moon phase to have a better life for the mat. Traditional knowledge and practices indicate that if culms are collected like this, the fungal and pest problem on the mat will be less.

Generally, culms of appropriate maturity are used for weaving *Kannadippaya* to ensure flexibility and durability. The maturity of culm is decided in a traditional way, from the sound produced by the culm when tapped with a knife and also based on the appearance of sheath. Culms of half maturity (called as *payatti*- at 6 months to one year old), are taken for mat weaving to have flexibility for slivers. Selection of specific variety of reed bamboo of proper maturity, making and drying the slivers and weaving involve traditional know how and skill of the tribal artisans.

b. Processing:

Collected culms are made into pieces after removing nodes. Some groups process the culms

by immersing in water for many days for better quality. After taking out of water, slivers (called as “*poli*” or “*ali*” among tribespeople), are prepared. Culms are split vertically into 4-5 pieces with the help of sharp knives. Then slivers are extracted, starting from inner hollow proceeding outwards. 4-7 layers of ultra-thin slivers can be taken from each culm depending on the thickness of culm. The slivers may have a length of 70-80 cm, width of 0.4-0.5 cm and thickness of 1.0 mm. From the extracted slivers, the fourth and fifth slivers starting from inner core are used for weaving *Kannadippaya*. These specific slivers alone will have superior quality and sheen required for mat weaving. The rest of the slivers are used for making baskets, winnowing structures, handicraft items etc. Outer most green sliver, called as “*karimbliyan*”, will be used for adding decorations to basket items.

The slivers are polished and smoothened by pulling it beneath a sharp knife after placing over a piece of cloth. The smoothness and thinness of the mat is enhanced by smoothening of slivers. This work demands extreme attention and care. Slivers are then dried in hot sun on first day. Then they are half dried in mild sun light. In rainy season, slivers are dried over a platform above fire place in kitchen. The green pigments on both sides of dried slivers are then removed. The dried slivers are bundled separately as those for making mat (called as *paya poli*) and remaining ones (*param poli*) for basketry. The slivers, in tribal language are called as “*ali*” or “*poli*”. The slivers are kept ready in advance.

c. Weaving of mat:

‘Square’ is the basic design element repeated across (almost) all the varying weaving designs and dimensions of ‘*kannadippaya*’. The design over a mat could vary from repetition of small simple squares to highly ornamented and complex-looking squares arranged in lines and rows. Sometimes diagonal designs of squares are also adopted. The choice of design is left to the artisan. During weaving weavers give different designs locally called, “*Ottakannan*”, “*Randu vari*”, “*Moonnu vari*”, “*naluvu vari*” etc. “*Randu vari*” will have two rows of squares. “*Padakkannan*” represent the king and soldiers. *Nandu paya* (as called by *Muthuva* community) will have a greater number of small mirrors, sometimes more than 60 and is very attractive.

Each square (*kannadi*) and its surrounding warps and wefts on the mat impart it a unique appearance and beauty. Designs and squares become more clear and more visible with a slight change in the plane of view which is a unique character of the *Kannadippaya* and related products like baskets, winnowing structures, table mats, yoga mats etc.

There are no written documents available with the tribal community to illustrate or preserve the designs as the designs are kept in the minds of weavers. It is surprising to note that the weavers even do not count the warps and wefts taken for creating correct designs and arrangements of squares during the weaving of each mat. Traditional skill and knowledge acquired from elderly people are transmitted to next generation. The weaving of the mat is a fully manual process. The whole act of weaving is done by sitting on the floor with folded legs, holding the slivers under the feet of the artisan. As the weaving progress, the artisan moves around on the ground as per the designs in the mind. This process needs lots of attention, patience, skill, imagination and presence of mind.

The setting of warp and weft begins from a corner and progresses diagonally. Each *kannadi* (square) woven on the mat has a central eye over which a square pattern develops. Starting of squares design by deploying warps and wefts is called ‘*chuvadorukkal*’ which means setting the initial steps or laying the foundation. The steps in this process vary with the design selected. To describe weaving of a common design, in *Chuvadorukkal*, the first *kannadi* is made by setting 9 warps or vertical slivers (depending on the size of the mat, this number may vary) below the feet of the artisan, pointing outward from the weaver.

Then the first weft (horizontal sliver) is carefully placed below the first three warps, then above next 3 warps, then below the remaining three warps. Second weft is then placed below the first two warps, then above the next three warps, then below the next three warps and then above the remaining one warp. Third weft is placed below the first warp, then above the next three warps, then below the next three warps and then above the remaining two warps. As the weaving progresses warps and wefts are differentially arranged to create one *kannadi* with the “eye” in the centre. By deploying the warps and wefts, as described above, the eye or central point of the first square design for the mat is formed. Vertical warps and horizontal wefts are interlaced in a particular way during weaving. In *Oorali* vernacular the eye of *kannadi* is called as ‘*pokkil*’, the boarder portion of the mat is called ‘*theru*’. Number of *kannadi* or squares vary depending on the dimension of the mat and its design. Square design will also be woven on other utilitarian items, handicraft items, wall hangings, yoga mats, prayer mats, sitting mats and small table mats.

During the process of weaving the designs of mat, borders and corners will also be woven. The corner area is called as *moolachuvad* (*moola* in Malayalam meaning corner and *chuvad* is step) and the process of making corner is called *moola thirikkal* (marking the corner) or *moola odikkal* (bending the corner). All these processes are highly skilled ones.

Collecting reeds, processing, extracting slivers, polishing and drying of slivers may take 1-2 weeks and weaving of a sleeping mat may take approximately 60 hrs. More days are taken for weaving mats with small squares that are very fine in texture and design. All the weaving is done by sitting on the floor and keeping the warps and wefts under the feet. This posture adds strain to the back bone of the artisans.

Once the mat is finished the edges of slivers will be bent backwards *Mannans* call this process as “*vai pethana*”. The small fibers on the mat will be removed by sweeping with a broom, then washed and dried. Tribal people will keep the mats over fire place for better durability, after placing the mat inside a hollow reed. Both sides of this reed will be closed with dry leaves of wild banana to avoid smoke entering inside. Mats made with *noonjaleetta* are ideal for folding like this, to keep inside the reed.

J) Uniqueness:

Kannadippaya is the pride of tribespeople in Kerala, woven as a household item and also for presenting as a gift item for dignitaries. *Kannadippaya* is very smooth and shiny. It has unique designs, light-reflective properties and extreme flexibility. The uniqueness of ‘*Kannadippaya*’ is due to the species of reed used, maturity of the reed, processing of slivers, fineness of slivers used, *kannadi* designs over the mat, weaving method, and skill of the artisan all involving traditional knowledge and skill. Soft and fine slivers (mainly the fourth or fifth one starting from the inner hollow) are used for mat making.

‘Square’ is the basic design element that is repeated across (almost) all the varying weaving designs and dimensions of ‘*kannadippaya*’. *Kannadi* is the term used by tribal people to denote unique square designs on this mat. The design over a mat could be varying; from the repetition of small simple squares to highly ornamented and complex looking squares all arranged in lines and rows; the number of squares varies according to the design, from 1 to more than 60. Sometimes diagonal designs of squares are also made. The choice of design is left to the artisan. During weaving warps and wefts are differentially arranged to create one *kannadi* with the “eye (*kannu*)” in the center.

This tribal mat is famous for its unique “*kannadi*” designs and light reflective properties. A well-finished *kannadippaya* due to arrangements of warps and wefts of different designs can be viewed from various angles. Each *kannadi* and its surrounding warps and wefts on the mat impart a unique appearance and beauty. Designs and squares become clearer and more visible with a slight change in the plane of view and this is a very unique character of *kannadippaya* and related products. Adjacent woven patterns are like a mirror reflection of each other. For most luxury mats, along with *kannadi* designs, designs of trees, animals and birds are also made along the corners. Unique border designs adorn the mat. An ultra-fine quality *kannadippaya* is so flexible that it can be rolled and placed inside a reed culm (*eettakumbam*).

Mannan tribe people call *kannadippaya* “*nandupaya*”. *Kannadi* designs are arranged in different patterns to produce different types of mats. There are different names for *kannadippaya* according to designs of squares woven in it, like “*vedan paya*”, “*ottakkannan*”/ “*anachevidan*” (single squares design), “*randu vari*”(two squares in a row), “*moonnu vari*” (three squares in a row), “*naaluvvari*” (four squares in a row), “*nandupaya*”, “*padakkannan*” etc.

The size of mats varies as per the purpose for which it is woven and also consumer demand; A normal sleeping mat may have a size of 6x3 feet or 6x4 feet, yoga/ prayer mat may have a size of 5.5x2 feet, table mats and wall hangings may come to different sizes as per needs. Baskets are of different sizes and shapes, but with *kannadi* designs. Big wall hangings are also made nowadays to showcase this unique craft item.

This traditional mat of tribal communities is woven using slivers from special reed bamboo (thin-walled bamboo) grown in forests in Western Ghats. Fine quality *kannadippaya* is made of slivers from reed bamboos, locally called as *njoonjileetta/ponneetta/ njoorjora /meieeta/ neytheetta* [*Teinostachyum wightii* Bedd]. Other reed types locally called *kareetta (karoora)*, *pereetta*, *neerura*, *velleeta (velloora)*, *chittoora*, are also used for making *kannadippaya*. These types belong to *Ochlandra* genus. As *Teinostachyum wightii* Bedd. has long internodes, the requirement of joining the slivers is less.

The women of tribal communities are more specialized in making *kannadippaya* and related products with *kannadi* designs. The weaving of the mat is fully manual process. The whole act of weaving is done by sitting on the floor with folded legs and slivers holding firmly under feet.

The beauty and health benefits of this natural sleeping mat are unparalleled. This mat and bamboo products are very eco-friendly. *Kannadippaya* like any other natural mat have health benefits as it gives warmth during cool season and cool feeling during summer season. Tribespeople believe that people sleeping on this mat will not suffer from rheumatism and back pain. *Oorali* community in their traditional practices use *Kannadippaya* as a special mat for newborn babies. It is also told that making kids to lay down on this natural fibre mat adds to their muscle development and muscle strengthening. *Kannadippaya* woven with the good quality reed of correct maturity will last for many years, if used and stored properly. The mat is to be kept away from dampness. Tribespeople recommends to keep them above fire place or warm place.

The skill for this craft is very difficult to acquire and is maintained and preserved by tribal people orally, without any written documents. The weaving of *Kannadippaya* is a unique craft of tribal communities inherited from generations to generations. The skill involved in this craft is very difficult to acquire and is maintained and preserved through hands-on or ‘learning- by- doing’ mode by tribespeople, without written documents. If the weaving of *Kannadippaya* is

discontinued for one or two generations, the skill and knowledge of this traditional tribal craft will be lost forever.

K) Inspection Body:

1. Principal Chief Conservator of Forest (Wildlife) & Chief Wildlife Warden, FM, Government of Kerala
2. Director, Scheduled Tribes Development Department, Vikas Bhavan, Thiruvananthapuram
3. Director, KSCSTE - Kerala Forest Research Institute, Peechi, Thrissur, Kerala
4. President, Unarvu Pattikavarga Vividhodhesha Sahakarana Sangham, Palapilavu
5. Secretary, Unarvu Pattikavarga Vividhodhesha Sahakarana Sangham, Palapilavu
6. President, Vanasree Bamboo Craft and Vanavibhava Sheskarana Unit, Uppukunnu
7. Secretary, Vanasree Bamboo Craft and Vanavibhava Sheskarana Unit, Uppukunnu
8. President of the concerned District Panchayaths
9. Head, Extension and Training Division, KSCSTE - Kerala Forest Research Institute, Peechi, Thrissur, Kerala

Independent neutral agency:

KSCSTE-Kerala Forest Research Institute, Peechi, Thrissur, Kerala

L) Others:

Kannadippaya is durable for many years if it is handled carefully. Cost of big size *kannadippaya* varies from Rs.5,000-35,000, depending on quality and design. A *kannadippaya* of yoga mat size costs around Rs.5,000-7000. The pricing is according to the size and finish of the mat. Nowadays for enhancing marketability, small mats, that can be used as wall hangings, table mats, other decorative items, and utilitarian items are also made. Cost of small-sized mats may range between Rs. 250- 500. The time and effort put for making mats with unique designs and quality adds to its price.

This tribal craft form is in the verge of extinction due to penetration of plastic mats and baskets, that are more durable with less cost. Despite the demand for natural items by people from plains, the younger generation is not attracted to weaving of this mat as it is highly time-consuming and laborious. Documentation of this art is also poor. This tribal craft definitely need attention and support for its survival. Marketing strategies are less developed for this unique handicraft of tribal community.

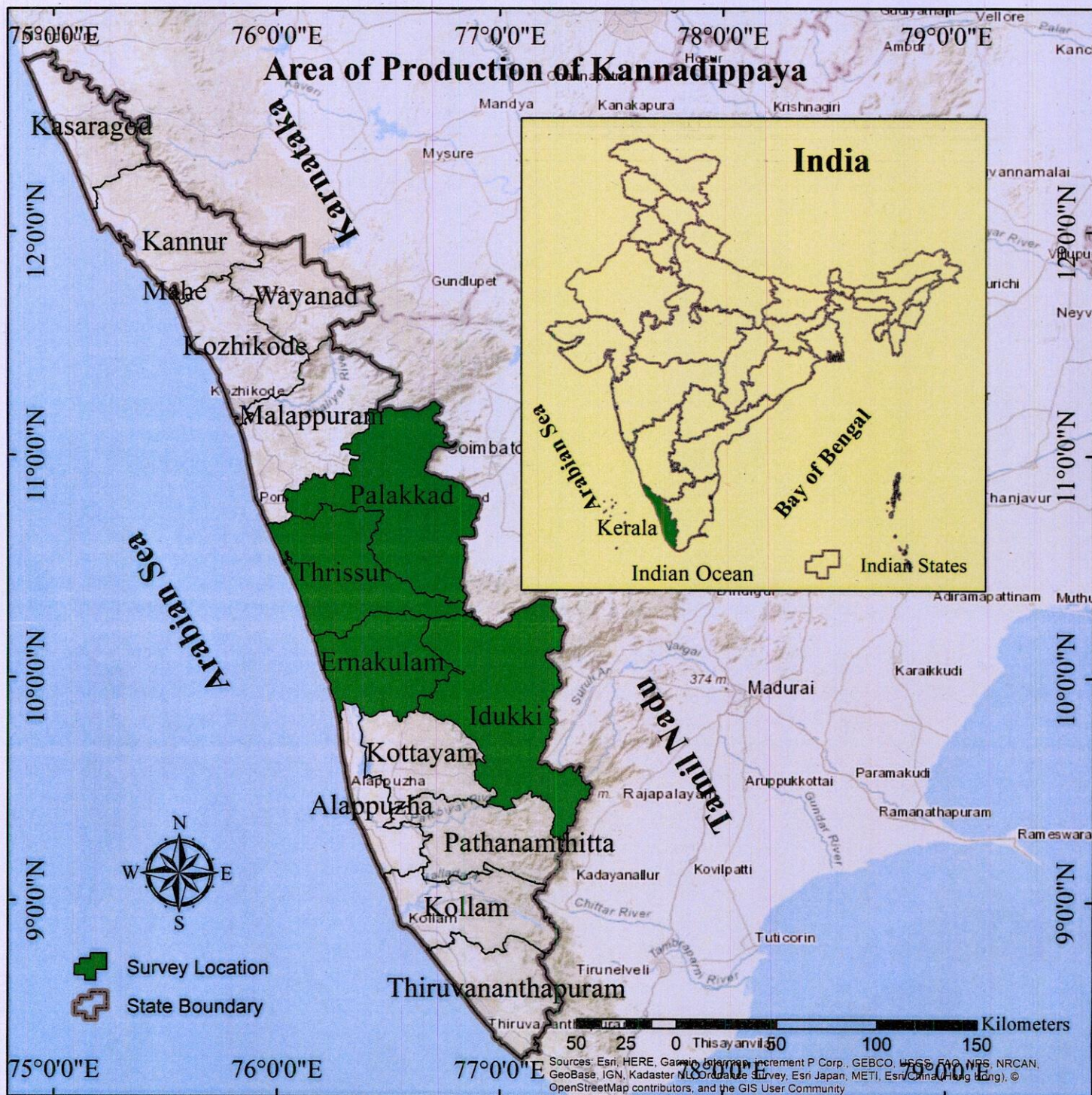
The Kerala Bureau of Industrial Promotion with support of Directorate of Industries and Commerce, together with the Kerala State Bamboo Mission and the National Bamboo Mission had initiated steps for exhibiting this tribal craft item in the annual bamboo festival. *Kannadippaya* has been the focus of attention in Kerala Bamboo Festival at Kochi during December 2021.

KSCSTE Kerala Forest Research Institute, Peechi is running a project entitled “*Kannadippaya* - special bamboo weaved mat product-Scientific, Technical and Marketing interventions for tribal empowerment” funded by the SEED division under the programme – TSP Techno interventions.

Kannadippaya is collectively empanelled under Tribal Cooperative Marketing Development Federation (TRIFED), a Govt. of India initiative to empower tribes, and this product is now showcased at Tribes India outlets in south India. The Conservation and Livelihoods team at

River Research Centre (RRC), an NGO at Chalakkudy is supporting and promoting mat weaving activities among *Kadar*, *Muthuvar* and *Malayar* indigenous people in the Chalakudy river basin, Kerala. The *Kannadippaya*, a signature weave of the *Muthuvar* people, has attained a push through their sale events in Bangalore, Kochi and Coonoor. Artisan cards were processed for the weaver women. Recently UNDP supported this NGO to create Forest Post (<https://forestpost.in>) for streamlining the production and strengthening market linkages of *Kannadippaya*.

ANNEXURE 3



Certified
[Signature]
 14/8/24

Dr. Kannan C.S.Warrier
 Director
 KSCSTE- Kerala Forest Research Institute
 Peechi-680653, Thrissur, Kerala



G.I. APPLICATION NUMBER – 1042

Application Date: 10-01-2023

Application is made by State Agricultural Management & Extension Training Institute (SAMETI) at Government of West Bengal, Ramkrishna Mission Ashrama, Narendrapur, District: South 24 Parganas - 700103, West Bengal, India for Registration in Part - A of the Register of **Radhunipagal Rice** under Application No. 1042 in respect of Rice falling in Class – 30 is hereby advertised as accepted under Sub-section (1) of Section 13 of Geographical Indications of Goods (Registration and Protection) Act, 1999.

- A) **Name of the Applicant** : State Agricultural Management & Extension Training Institute (SAMETI)
- B) **Address** : State Agricultural Management & Extension Training Institute (SAMETI)
Government of West Bengal, Ramkrishna Mission Ashrama, Narendrapur, District: South 24 Parganas - 700103, West Bengal, India

Facilitated By:

1. Patent Information Centre (PIC), West Bengal State Council of Science & Technology.
2. Bidhan Chandra Krishi Vishwavidyalaya (B.C.K.V.)

- C) **Name of the Geographical Indication** :

RADHUNIPAGAL RICE



- D) **Types of Goods** : **Class 30 – Rice**

E) **Specification:**

- Radhunipagal is a popular **aromatic rice** variety among others.
- Being non-Basmati type rice, it is so fragrant & delicious that cooks could not resist himself/herself eating up such a dish made up of this rice.
- Landrace Radhunipagal paddy has also the capability of **stress tolerance**.
- It has some medicinal properties also as it is a **Fe (iron) and Zn (zinc) -rich rice variety**.

The specific characteristics of “Radhunipagal” rice plant variety are as follows:-

- (a) **Plant:** Adaptable to rain fed medium land, long-duration type (145–155 days maturity) and tall in stature (135–145 cm)
- (b) **Stem:** Stem length (excluding panicle) long (125–130 cm), absence of anthocyanin pigmentation in nodes and internodes or presence at lower nodes
- (c) **Leaf:** Long (65–75 cm), narrow (0.9–1.0 cm) and green in colour, ligule split, auricles present, flag leaf attitude semi-erect at early observation and horizontal at late observation
- (d) **Inflorescence:** Medium panicle length (21–24 cm) and drooping curvature of main axis
- (e) **Flower:** Bi-sexual flower, six yellow-coloured anthers, and white, feathery stigma
- (f) **Grain and kernel:** Lemma and palea of grains straw in colour with purple spot at tip, grains without awns, low test weight (10.0–10.3 g), short bold type white kernel (length 3.5–3.7 mm, breadth 1.8–2.0 mm and L/B ratio 1.9–2.0), low amylose content (16.8–17.4 %) and medium-strong aroma.

Short-grained aromatic cultivars have tremendous export possibility and it carries the domestic demand in the local markets as well as the markets of other states in the country. The cultivars viz. ***Radhunipagal*** in Red Lateritic Zone, khas (Gobindabhog / Badshabhog) in Central Alluvial Zone, Tulaipanji and Kalonunia in North Bengal etc. are well known varieties in the state of West Bengal. Among 35-40 traditional scented rice landraces of West Bengal, '*Radhunipagal*', one small-grained aromatic rice, is popular in domestic market of *Rarh* (lateritic) and lower gangetic region of Bengal for its excellent quality features. The name of '*Radhunipagal*' probably bears the fact of its pleasant aroma, during cooking and when served, having a maddening effect on the neighbouring people, particularly the lady-cook, in domestic life system in rural Bengal.

a) Plant characters:-

The indigenous aromatic rice cultivar, '*Radhunipagal*' was evaluated in open field with three replications at 'C' Block Farm, Bidhan Chandra Krishi Viswavidyalaya, Kalyani, Nadia, West Bengal during kharif (wet) season of 2012, 2013 and 2014 following conventional agronomic practices. Each test experiment unit / trial plot consisted of 6-metre distance of 20 cm. The DUS descriptors following the 'PPV&FRA DUS Test Guidelines for Rice' were used to characterize the morphological and related traits of '*Radhunipagal*' rice.

Table: Plant characteristics of '*Radhunipagal*' rice following DUS guidelines of PPV&FRA

SI no.	Characteristics	Code / Value	Description
1.	Coleoptile: colour	2	Green
2.	Basal leaf sheath colour	3	Purple lines
3.	Leaf : Intensity of green colour	5	Medium
4.	Leaf : anthocyanin colouration	1	Absent
5.	Leaf sheath : anthocyanin colouration	9	Present (inner side of lower leaf sheath)
6.	Leaf: pubescence of blade surface	5	Medium
7.	Leaf : Auricles	9	Present
8.	Leaf : anthocyanin colorations of auricles	1	Colourless
9.	Leaf : collar	9	Present
10.	Leaf : anthocyanin colouration of collar	1	Absent
11.	Leaf : ligule	9	Present
12.	Leaf: shape of ligules	3	Split

13.	Leaf: colour of ligule	1	White
14.	Leaf : length of blade	7	Long (70.0 cm)
15.	Leaf : width of blade	3	Narrow (0.98 mm)
16.	Culm : attitude	3	Semi-erect
17.	Time of heading (50% of plants with panicles)	7	Late (124 days)
18.	Flag leaf attitude of blade (early observation)	3	Semi-erect
19.	Spikelet : density of pubescence of lemma	3	Weak
20.	Male sterility	1	Absent
21.	Lemma: anthocyanin colouration of keel	1	Absent
22.	Lemma: anthocyanin of area below apex	1	Absent
23.	Lemma: anthocyanin colouration of apex	7	Strong
24.	Spikelet : colour of stigma	4	Light purple
25.	Stem: thickness	5	Medium (0.52 cm)
26.	Stem: length (excluding panicle)	5	Medium (129.3 cm)
27.	Stem: anthocyanin coloration of nodes	1	Absent (Present usually at lower nodes)
28.	Stem : intensity of anthocyanin colouration of nodes	3	Weak
29.	Stem : anthocyanin colouration of internodes	9	Present
30.	Panicle: length of main axis	5	Medium (21.9 cm)
31.	Flag leaf: attitude of blade (late observation)	5	Horizontal
32.	Panicle: curvature of main axis	7	Drooping
33.	Panicle: number per plant	3	Few (9.57)
34.	Spikelet: colour of tip of lemma	5	Purple
35.	Lemma & Palea : Colour	7	Purple spots / furrows on straw
36.	Panicle: awns	1	Absent
37.	Panicle : presence of secondary branching	9	Present
38.	Panicle : secondary branches	2	Strong
39.	Panicle : attitude of branches	3	Erect to Semi-erect
40.	Panicle: exertion	7	Well exerted
41.	Time of Maturity	7	Late (151 days)
42.	Leaf : senescence	5	Medium
43.	Sterile lemma: colour	4	Purple

44.	Grains: weight of 1000 fully developed grains	1	Very low (10.18 g)
45.	Grain : length	1	Very short (5.78 mm)
46.	Grain : width	2	Narrow (2.35 mm)
47.	Decorticated grain: length	1	Very short (3.57 mm)
48.	Decorticated grain: width	1	Very narrow (1.86 mm)
49.	Decorticated grain shape	2	Short bold
50.	Decorticated grain: colour	1	White
51.	Endosperm: presence of amylose	9	Present
52.	Endosperm: content of amylose	3	Low (17.0 %)
53.	Gelatinization temperature through alkali spreading value	3	Medium (Alkali score 3.2)
54.	Decorticated grain : aroma	9	Present (Medium-strong)

Source: [Source: Roy (2015) and Pal (2016)]

b) Grain characters:-

Grain quality characters of 'Radhunipagal' rice:

Parameter	Value	
	Average	Range
Hulling (%)	76.4	75–78
Milling (%)	69.2	67–70
Head rice (%)	62.9	61–63
Kernel length (mm)	3.57	3.5–3.7
Kernel breadth (mm)	1.87	1.9–2.0
L/B ratio	1.91	1.9–2.0
Kernel type	Short bold	Short bold
Kernel colour	White	White
Amylose (%)	17.0	16.8–17.4
Protein (%)	7.0	6.9–7.2
Alkali Value / Gelatinization Temperature	3.2	3.0–3.4(High-intermediate)
Kernel length after cooking (mm)	6.8	6.7–6.9
Elongation ratio	1.72	1.7–1.8
Aroma	2.45	2.3–2.6(Medium-strong)

[Source: Adapted from Ghosh and Ghose (2007); Banerjee (2011), Roy (2015), Pal (2016) and other related works]

Mean hulling, milling and head rice recovery of 'Radhunipagal' rice is 76.4, 69.2 and 62.9%, respectively. The average kernel length, breadth and L/B ratio of milled rice are 3.57 mm, 1.87

mm and 1.91, respectively. Based on kernel size parameters, it is categorized as short bold (SB) type grain. The milled rice of ‘*Radhunipagal*’ contain low-intermediate (17.0%) amylose, 7.0% protein, high-intermediate gelatinization temperature (alkali spreading value 3.2), medium (1.72) elongation ratio and medium-strong (2.45) aroma.

F) Description:

“*Radhunipagal*”, is an Aman (rice grown in winter) rice, cultivated in the high land area. Grains are smaller in size, highly scented, sweet to taste, delicious and nutritious, and easily digestible. Colour of grains is brownish white and terminal end black. It is usually used as unboiled rice for the preparation of payesh, fried rice, and polao. *Radhunipagal* is generally cultivated in the middle of July and harvested in the month of November or early December. Cropping is done in the highland without chemical fertilizer and pesticide and depending on rain water. It is popular aromatic short grain rice in West Bengal. It has also some stress tolerance capability. “Radhuni” means the cook and “pagal” is termed for mad peoples. Hence, the name ‘*Radhunipagal*’ was given to this variety as the smell of rice after cooking maddens the cook.

At Rice Research Station (RRS), Chinsurah (W.B.), at least 35 indigenous aromatic rice varieties (IARVs) are being maintained and characterized through trials in different agro-climatic zones of the state since last 10 years. Among them, 14 varieties have been characterized and documented relating to agro-morphic, physico-chemical, milling and cooking quality traits. Likewise, 40 such IARVs are being maintained and characterized at Biodiversity Conservation Farm of Agricultural Training Centre (ATC), Fulia, Nadia, and are being distributed among the farmers.

G) Geographical area of Production and Map as shown in page no:

Radhunipagal rice has been traditionally cultivated in South Bengal region for hundreds of years. With the introduction of high yielding varieties during last 50 years, its cultivation has been marginalized in different blocks in the districts of the region. As per District Gazetteers of 19th and 20th Century, ‘*Radhunipagal*’ rice is traditionally grown in lower *gangetic* plains and *rahr* region of west Bengal for about 400-500 years. Based on available data and survey-related information, it is estimated that ‘*Radhunipagal*’ paddy is cultivated in about 1,500-2,000 ha land during *kharif* season every year in the state. The native area of *Radhunipagal* rice consists of the districts in South Bengal region, namely Birbhum, Bankura, Nadia, North 24 Parganas, Purba Bardhaman, Pashim Bardhaman, Howrah, Hooghly, Murshidabad, Purba Medinipur, Pashim Medinipur, Purulia, South 24 Parganas and Jhargram. About **10,000-12,000 farmers** cultivate ‘*Radhunipagal*’ rice in small lands traditionally for domestic consumption and sale to markets or others in South Bengal region of the state.

Geo-physical description of some native districts of ‘*Radhunipagal*’ rice during 1872 and 2011

District	1872		2011	
	Location	Area (sq. miles)	Location	Area (sq. km)
Birbhum	24°09′–23°33′N, 88°06′–87°09′E	1344	23°32′–24°35′N, 88°01′–87°05′E	4545
Bankura	23°37′–22°54′N, 87°33′–86°51′E	1346	23°38′–22°38′N, 87°45′–86°36′E	6871
Nadia	24°11′–22°52′N, 89°24′–8°10′E	3414	22°53′–24°11′N, 88°09′–88°48′E	3900
Burdwan	22°46′–23°53′N, 86°52′–88°39′E	3525	22°56′–23°53′N, 86°48′–88°25′E	7028
Howrah	22°13′–22°47′N, 87°51′–88°22′E	510	22°48′–22°12′N, 88°23′–87°20′E	1467

Hooghly	22°13'–23°40'N, 89°24'–88°10'E	1482	23°01'– 22°39'N, 88°30'–87°30'E	3149
Murshidabad	23°43'–24°52'N, 87°39'–88°16'E	2462	24°50'– 23°43'N, 88°46'–87°49'E	5341
North 24 Parganas	22°57'–21°55'N, 88°20'–88°06'E	2536	22°15'– 22°11' N, 89°05'– 88°20'E	4094
South 24 Parganas			21°29'– 22°33' N, 88°03'– 89°04'E	9960
Paschim Medinipur	22°56'–21°36'N, 88°13'–86°35'E	5082	21°36'– 22°57'N, 86°33'–86°11'E	9345

[Source: District Gazetteers of Bengal, Statistical Handbook of West Bengal and others]

Birbhum

Hunter (1877) mentioned that “Birbhum (Beerbhom), the northern-most District of the Bardwan Division, is situated between 24°9' and 23°33' north latitude, and between 88°6' and 87°9' east longitude. It contains an area, after recent transfers to and from the neighbouring districts of Bardwan and Murshidabad and the Santal Parganas of 1344 square miles as returned to me by the Bombay Commissioner in 1874, and a total population, as ascertained to the Census of 1872, of 696,943 souls.”

“From historical records, it is fairly clear that the district included in Rarh was mainly under different Hindu rulers, locally called Bir Rajas. It is quite possible, therefore, that the district was named Birbhum to indicate simply the territory of the Bir Rajas” (Majumdar, 1975). No important or navigable river flows through Birbhum. The largest stream is the Ajai, which, however, nowhere intersects the District, the principal streams flowing through Birbhum District are as follow: the Mor or Maureksha river, the Bakeswar river, the Kopai or Kopa or Sal Nadi, the Dwarka Nadi, etc.

Bankura

According to Hunter (1877), “Bankura, the western-most District of the Bardwan-Division, is situated between 23°37' and 22°54' north latitude, and between 87°33' and 86°51' east longitude. According to the Census of 1872, it contains a total population of 526,772 souls, and an area, after recent transfers to and from the neighbouring Districts of Bardwan and Manbhum, of 1346 square miles.”

Banerji (1968) stated that “The most plausible explanation of the town as also the district assuming their present names may perhaps be found in the very widespread practice of the Dharma cult in this region—the object of veneration being commonly known by the name of Bankura Ray although there are other local names of the deity..... One of the earliest references to Bankura Ray is also found in the Chandi Mangal, a long devotional verse written by Mukundaram Chakravarty probably between 1594 and 1600 A.D. The two principal rivers of Bankura district are the Damodar and Dhalkisor or Dwarekeswar, called lower down in its course the Rupnarayan.”

Burdwan/ Bardhaman

According to Peterson (1910), “The district of Burdwan, one of the western districts of the Bardwan Division, is situated between 22°56' and 23°53' north latitude, and between 86°52' and 88°39' east longitude. It contains an area of 2,689 square miles as ascertained by the latest survey, and a population, according to the census of 1901, of 1,532,475 persons The name Bardhamana is the vernacular is a corruption of the Sanskrit Vardhamana (the present participle passive of the verb Vardh) and implies the ‘increasing or prosperous.” Chaudhuri et. al.(1994) mentioned the other view that “the word ‘Barddhamana’ might have been named after the 24th Jaina Tirthankara or Barddhamanasvami. According to Kalpasutra of the Jainas, Mahavira spent some time in Astikagrama which was formerly known as Barddhamana.”

"The river system in Bardhaman includes the Bhagirathi-Hugli in the east, the Ajay and its tributaries in the north and the Dwarakeswar, the Damodar and its branches in the south-west. Besides, there are innumerable old beds of rivers all over the area" (Chaudhuri et. al., 1994).

Hooghly

Hunter (1876a) described that "The district of Hugli (including the magistracy of Howrah) forms the south-eastern portion of the Bardwan Division, and is situated between 22°13'0" and 23°14'0" north latitude and between 87°48'0" and 88°34'0" east longitude. It contains a total population of 1,488,556 souls, as ascertained by the Census of 1872; and total area, after recent transfers to the neighbouring Districts of Midnapur and Bardwan, of 1482 ½ square miles."

"The place-name 'Hooghly' has had a geographical connotation only since the middle of the 16th century. With the advent of the Portuguese and, subsequently, of other European traders into this part of the country, many of the erstwhile obscure villages on the west bank of the Bhagirathi were transformed into urban areas forming, in course of time, the principal towns of the present-day district. The district of Hooghly, as we know it today, came into existence in 1795" (Banerji, 1972). The river system of Hooghly district comprises two major groups: the Damodar group and the Bhagirathi group, including other rivers like Saraswati or Kunti, Ghia, Kana Damodar, Kausiki, Behula, Kantul, etc.

Medinipur

As per Hunter (1876), "Midnapur, the southernmost District of the Burdwan Division, is situated between 22°56'40" and 21°36'40" north latitude, and between 88°13'30" and 86° 35'22" east longitudes. It contains a total population, as ascertained by the Bengal Census of 1872, of 2,540,963 souls; and a total area, after, recent transfers, of 5082 square miles."

O'Malley (1911) reported, "The river system of Midnapore consists of the Hooghly, of its tidal tributaries, the Rupnarayan, Haldi and Rasulpur, and of their sub-tributaries. The only other river of importance is the Subarnarekha." The district was divided into two separate districts: (i) Purba Medinipur and (ii) Paschim Medinipur on 1 January, 2002.

North 24 Parganas

Hunter (1875) mentioned that "The district of the 24-Parganas lies between 22°57'32" and 21°55'20" north latitude, and 88°20'51 and 88°6'45" east longitude. It contains a total area, as returned by the Surveyor General in 1871, of 2536 square miles, exclusive of the Sunderbans, but inclusive of the area of Calcutta, which is 7.80 square miles, and of its suburbs, which amount to 23.17 square miles. The population of the District, according to census of 1872, which takes the area of 2788 square miles, is 2,210,047 souls, exclusive of the towns of Calcutta, but inclusive of its suburbs". According to De (1994), "The nomenclature 24-Parganas has been in vogue since 15 July 1757 when Mir Jafar whom the East India Company had just established as Nawab of Bengal ceded to the Company the rights of 24 mahals.

The rivers of the district are mostly headless distributaries of the Ganga. Except for a limited period during the flood season, even the mighty delta-builders Jalangi, Mathabhanga and Ichamati, received no supply from the Ganga. They now merely serve to receive local drainage and carry it off into tidal waters." The present form of the district came into existence on 1st March, 1986 with bifurcation of erstwhile 24 Parganas into North 24 Parganas and South 24 Parganas.

South 24 Parganas

W.W. Hunter in his book 'A Statistical Account of Bengal' (1876) said, "The District as at present constituted is bounded on the north by the Districts of Nadia and Jessore; on the east by Jessore, from which it is separated by the Kabadak River, which, after receiving various streams and deltaic branches of the Ganges, takes the following names in its lower course through the Sundarbans, viz. the Arpángásí, Bara Pángá, Namgad Samudra, and finally, near the sea, the Málanchá. On the south, the District is bounded by the Bay of Bengal and on the west by the Húgli River. With the exception of the northern boundary, therefore, the District limits follow the natural ones laid down by watercourses and the sea."

Purulia

According to Hunter (1877), "The District of Manbhum forms the eastern part of the Chuti Nagpur Division, and is, in fact, the first step in the gradual descent from the elevated plateau of Chuti Nagpur Proper to the plains of Lower Bengal. It lies between 22° 37' and 24° 3' north latitude, and between 85° 51' and 87° 16' east longitude; area in 18,75,4914 square miles, according to the Surveyor-General; population, as ascertained by the Census of 1872, 995,570 souls. The chief town and Administrative Headquarters of the District is Purulia, situated in 23° 0' 20" north latitude and 86° 26' east longitude. Manbhum is bounded on the north by the Districts of Hazaribagh and Birbhum; on the east by Bardwan and Bankura; on the south by Singbhum and Midnapur; and on the west by Lohardaga and Hazaribagh. A considerable portion of the northern and north-eastern boundary is marked by the Barakhar and Damodar rivers; while on the west and south, the Subarnarekha river divides the District from Lohardaga and Singbhum."

Nadia

Hunter (1877) mentioned that "the District of Nadia forms the northern and northwestern portion of the Presidency Division, and lies between north latitude 24° 0' and 22° 52' 33", and east longitude 89° 24' 41" and 88° 10' 3". It contains an area, after recent transfers, of 3414 square miles, as revised in the Boundary Commissioners' Office up to October 1871; and a population, according to the Census Return of 1872, of 1,812,795 souls. The District takes its name from the town of Nadia, or Nabadwip, situated on the west bank of the Bhagirathi; but the Administrative Headquarters and Chief City of the District (although not the most populous) is Krishnagar (Krishnanagar), on the Jalangi river, in latitude 23° 23' 31", and longitude 88° 30' 58".

Howrah

As per Hunter (1876), "The Magisterial District of Howrah forms a transporting suburb of Calcutta. For revenue purposes it is included within Hugli, but in other respects it constitutes a separate District. This volume treats of an area of 6664 square miles, containing a population of 4,039,619 souls. The statistics were collected for the most part in the years 1870-72."

Murshidabad

W.W. Hunter (1876) in his book mentioned, "It is situated between 23° 0' 43' 15" and 24° 52' 0" north latitude, and 87° 39' 5" and 88° 16' 55" east longitude. The area, exclusive of the larger rivers, is 246,244 square miles, as returned by the Boundary Commissioner in 1874. The total population, as ascertained by the Census of 1872, is 1,353,626 souls. The District of Murshidabad is bounded along its whole frontier from the extreme north to the south-east by the Ganges, which separates it from the Districts of Maldah and Rajshahi. On the south it is bounded by the Districts of Nadiya and Bardwan, the river Jalangi forming the south-eastern frontier for a considerable distance. To the east lie the Districts of Birbhum and the Santal Parganas."

H) Proof of Origin (Historical records):

Among 35-40 traditional scented rice landraces of West Bengal, 'Radhunipagal', one small-grained aromatic rice, is popular in domestic market of 'rarh' (lateritic) and lower gangetic region of Bengal for its excellent quality features. The name of 'Radhunipagal' probably bears the fact of its pleasant aroma, during cooking and when served, having a maddening effect on the neighbouring people, particularly the lady-cook, in domestic life system in rural Bengal.

The state of West Bengal has precious wealth of genetic diversity in aromatic rice (Singh *et al.*, 2000; Shobharani and Krishnaiah, 2001 and Deb, 2005). It is estimated about 3,00,000 tonnes of such premium rice are produced every year in the state (Bhattacharya, 2003), which have different end-uses like cooked table rice, dessert (*payesh*), *pulao*, etc

The first account of folk rice varieties of the Bengal Province was given by W.W. Hunter (1876-1881), who recorded the different rice varieties grown in different seasons and different types of land and climatic conditions. After the partition in 1947, the folk rice genetic diversity of the Indian side of Bengal was considerably reduced by the genetic isolation of the local varieties of the international border. The singular reason for the vanishing of thousands of local rice varieties is their steady replacements with the so called "high yielding varieties" (HYVs), introduced in 1960s. Certain folk rice variety like **Radhunipagal** had distinct culture religious values, and was used during certain special religious or social ceremonies. Many folk rice varieties were grown for their special aroma and flavour, which are distinctly lacking in HYVs. A small number of folk varieties fetch higher price on market than HYVs.

West Bengal boasts of at least 42 extant varieties that are grown by indigenous farmers for producing scented rice for special culinary purposes: Badsha bhog, Bhim-sal, Cheena kamini, Chini atap, Chhoto nuniya, Dana guri, Dar-sal, Dehradun gandeswari, Deulabhog, Gandha malati, Gandeswari, Gayasur, Gobinda bhog, Gujuri-bhog, Kalojira, Kalonunia(=Kalijira), Kamini bhog, Kanakchur, Karpurtul, Katari bhog, Kanthali champa, Khas dhan, Khaskani, Khudi khasa, Lal badshabhog, Lilabati, Mohanbhog, Narasimha jata, Parmai-sal, Radhashree, Radhatilak, **Radhunipagal**, Rani kajal, Sada nuniya, Shiyal bhomra, Subasita, Tulaipanji, Tulsibhog, Swarnakanti, Tulsi manjari and Tulsi mukul. Among these extant varieties Radhunipagal has a slender grain particularly suited for making aromatic puffed rice.

In the book "A Statistical Account of Bengal" by W.W. Hunter Vol. - IX (First print-1876) **Radhunipagal** was described as one of the most fragrant varieties amongst rice. The aman rice is sub-divided into an immense number of subordinate varieties, which differ from each other in the fineness of the grain, flavor, fragrance, and other particulars. The author mentioned that the name **Radhunipagal** possess that "which maddens the cook" which implies that the cook could not resist him/herself from eating up such a fragrant dish.

According to the book "Shadharan Krishi Vigyaan" General Agriculture Including Soil Management And Crop Culture, By Sri Bijoykrishna Ghosh (Second Pub.: 1953, Bengali: 1360) **Radhunipagal** is a fine grained rice and aromatic also.

Aman paddies are suited for ordinary paddy land not for "bil" land. There are many evidences telling that, Burdwan district is much popular for the production of different indigenous varieties of scented fine grained rice such as Gobindobhog, Badshabhog, etc. and at the same time scented but not very fine grains like **Radhunipagal**.

In the book Midnapur district gazetteer **Radhunipagal** was described as an Aman season rice and its sown broadcast and not transplanted. It was sown in April and May and reaped in

November and December. George Watt (1891) reported in his book, entitled 'A Dictionary of the Economic Products of India, Vol. V' that: "Some forms of rice are scented,..... Scented rices are common, for example, in Orissa, Thana, Bihar, and are much prized by certain classes of people of the scented rice, Benaphuli, Kamini, Bans-mati and **Radhuni-pagla** (or cook-maddening) are considered the best." Singh et al. (2000) enlisted major aromatic rice of different states of India, wherein 'Radhunipagal' was mentioned as a small-grain scented rice of West Bengal mainly cultivated in the districts of Birbhum, Bankura, & Bardhaman. Das and Sasmal (2006) reported a collection of 126 local rice varieties from 12 districts of West Bengal. Of which, 'Radhunipagal' was collected from low lands (upto 30 cm water) of Purulia district and its plant, grain and kernel characteristics were documented in a Compendium entitled, 'Rice: Its conservation and evaluation – West Bengal perspective'.

Yadav et. al. (2014) reported that Radhunipagal rice were usually cultivated in the districts of Birbhum, Bankura, Purulia, Burdwan, Hooghly, etc. in West Bengal. In 24 Parganas & Sundarbans district gazetteer, Vol- I, Radhunipagal was mentioned one of the chief varieties of Aman rice. Mrityunjay Ghosh et. al. in their research article had mentioned about the morpho-genetic characterization of scented landrace Radhunipagal rice. Radhunipagal Rice and its production, processing and marketization are mentioned in the booklet published by B.C.K.V.

I) **Method of Production:**

'Radhunipagal', a native short-grained scented rice of South Bengal region, was cultivated with traditional knowledge and culture for hundreds of years as per District Gazetteers (Hunter, 1875, 1876, 1877 and Mukherji, 1901), but before '70s of the last century. With the introduction of chemical fertilizers, pesticides, irrigation facilities, etc.; some modern technologies have been slowly adopted by the farmers during last 3–4 decades. The present production technology of 'Radhunipagal' rice is described below based on sample survey in native areas.

a) **Soil type:**

The description of soils in native districts of 'Radhunipagal' rice as mentioned in different District Gazetteers is summarized below:

Description of topography and soil in native districts of 'Radhunipagal' rice

District	Description of soil	Reference
Birbhum	The high lands to the west are located on the hard impervious crystalline rocks (Archaeans), while the rest is made up of the Gondwana sediments, the Tertiaries, the laterites (both primary and detrital) and the alluvium. The Gondwanas and the Tertiaries probably extend below the detrital laterites and the alluvium. These sediments in their turn are underlain by basic lava flows some outcrops of which are found in the Nalhati thana. Throughout almost the entire area of the district the surface is broken by a succession of undulations, the general trend of which is from north-west to south-east.	Majumdar (1975)
Bankura	The district may thus be divided broadly into three topographic regions: the hill country to the west, the connecting undulating tract in the middle, and the level alluvial plains to the east—one merging indistinguishably into the other.	Banerji (1968)
Burdwan	The eastern portion of the district is a delta consisting of	Chaudhuri <i>et.al</i>

	wide plains of two family groups: Ganga Alluvium and Vindya Alluvium. The family name Ganga Alluvium (viz. Ganga Riverine and Ganga Flat lands) covers Katoya, Purbasthali and Kalna area; while Vindya Alluvium (viz. Damodar Riverine lands, Damodar Flat lands and Damodar Uplands) occurs in Ketugram, Mangolkot, Manteswar, Memari, Raina, Khandaghosh, Jamalpur, Barddhanan Sadar, Bhatar and parts of Galsi and Ausgram.	(1994)
Hooghly	The district may be broadly divided into two main natural divisions, the plains and the uplands, the river Dwarakeswar forming the dividing line between the two. The flat alluvial plains may again be subdivided into three regions, namely (i) Dwarakeswar-Damodar interrivierine plain, (ii) the Damodar-Bhagirathi interrivierine plain and (iii) the <i>char</i> lands and the meander loops.	Banerji (1972)
Medinipur	In the alluvial tract a clay soil is known as <i>entel</i> or <i>ethel</i> , loam as <i>doash</i> , <i>dorash</i> or <i>doseta</i> , and sandy loam as <i>bele doash</i> . In the laterite tract the soils are mostly loam and sandy loam having the same names as in the alluvial portion, but their colour is reddish-brown, and they are inferior in fertility to the corresponding types of soil in the alluvial tract.	O'Malley (1911)
North 24 Parganas	Most of the soils derived from alluvial deposits are azonal with little or no profile development. Clay loam is the predominating type.	De (1994)

The Department of Agriculture, Government of West Bengal and National Bureau of Soil Survey and Land Use Planning, Kolkata made a 'Soil Fertility Maps of different districts of West Bengal' in recent times under a collaborative Project. Based on the above-mentioned survey-cum-research work, Sen and Sarkar (2012, 2013 and 2014) reported the present soil fertility status in Bankura, Howrah and North 24 Parganas districts of West Bengal, from which a summative description of physico-chemical properties of soil of these four districts is given below. Purulia resembles the soil characteristics like that of Bankura district of West Bengal whereas Nadia & Murshidabad share the soil characteristics of Bardhaman as these districts lie on the lower Gangetic plain. Howrah & South 24 Parganas district of West Bengal primarily feature alluvial soil. This type of soil is formed by the deposition of sediments from rivers and is typically rich in nutrients, making it suitable for agriculture.

The soil of native districts is basically old and new-alluvium type, comprising mostly coarse and fine silt. The soil is generally acidic or neutral in nature along with low to medium organic carbon content. The available nitrogen, phosphorus and potassium in soil were mostly in the category of low to medium, but the available sulphur content was usually medium to high. Besides, the soil is non-deficient in available manganese, copper, zinc and boron content.

Physico-chemical properties of soil in three native districts of 'Radhunipagal' rice

Parameter	Range	Classification / Group	Bankura	North 24 Parganas	Howrah
			Area	Area	Area

			(sq. km.)	(sq. km.)	(sq. km.)
Soil structure	Silt	Coarse and Fine	5340.6 (77.6%)	2458.6 (60.0%)	1145.4 (78.1%)
	Clay		1001.7 (14.6%)	1135.3 (27.8%)	142.2 (9.7%)
Soil pH	4.5–6.5	Acidic	5918.3 (86.0%)	1014.7 (24.8%)	739.7 (50.5%)
	6.5–7.5	Neutral	163.5 (2.4%)	1591.2 (38.8%)	409.1 (27.9%)
Organic carbon (%)	<0.50–0.75	Low to Medium	5137.2 (74.7%)	3263.5 (79.7%)	104.0 (7.1%)
Available Nitrogen (kg / ha.)	<280–450	Low to Medium	4755.5 (69.1%)	3381.8 (82.6%)	432.1 (29.5%)
Available Phosphate (kg / ha.)	<45– 90	Low to Medium	5929.9 (86.2%)	3051.4 (74.5%)	1136.3 (77.5%)
Available Potassium (kg / ha.)	<200–350	Low to Medium	5968.3 (86.8%)	2249.8 (55.0%)	982.1 (66.9%)
Available Sulphur (mg / kg.)	10– >15	Medium to High	5769.6 (83.9%)	2858.3 (69.8%)	1287.6 (87.8%)
Available Iron (mg / kg.)	25–200	Non-deficient	5101.9 (74.2%)	1022.8 (24.9%)	1165.0 (79.4%)
Available Manganese (mg / kg.)	1–100	Non-deficient	5883.6 (85.7%)	3314.0 (81.0%)	1195.4 (81.7%)
Available Copper (mg / kg.)	0.5–4.0	Non-deficient	3376.6 (49.1%)	3276.1 (80.1%)	765.5 (52.2%)
Available Zinc (mg / kg.)	0.6–2.0	Non-deficient	5515.0 (80.2%)	749.1 (18.3%)	660.8 (45.1%)
Available Boron (mg / kg.)	0.06–0.36	Non-deficient	4656.6 (67.7%)		418.8 (28.5%)

*Figures in parentheses represent % of total area of respective district

[Source: Adapted from Sen and Sarkar (2012, 2013 and 2014)]

b) Season and the Climatic Condition:

Hunter (1877) gave a brief idea about the climatic condition of Burdwan district in his book, A Statistical Account of Bengal: Districts of Bardwan, Bankura and Birbhum as: “The climate of Bardwan may be divided into three seasons, – the cold season, ranging from about the middle of October to the middle of February; the hot season, ranging from about the middle of February to the middle of June; and the rainy season, from about the middle of June to the middle of October.” The meteorological parameters (viz.temperature and rainfall) recorded in some native districts during the particular year or period in 19th and 20th century is summarized in Table 4.2.

Temperature

According to Peterson (1910), “there is a steady fall until the monsoon is established when the average day temperature remains steady at about 90°F till October. Night temperature remains almost unchanged until September when it begins to fall, and is 75°F in October, 64°F in November.”

Mean monthly-average maximum and minimum temperature in different native districts of ‘Radhunipagal’ rice during 2005 was found to vary among 6 months (June–November) as: Birbhum (29–38°C and 15–27°C), Bankura (29–39°C and 16–28°C), Burdwan (29–38°C and 16–27°C) and Midnapur (28–38°C and 17–28°C) (Government of West Bengal, 2005).

Humidity

Mean monthly-average relative humidity at 8.30 A.M. at different district head-quarters during 2005 was found to vary among 6 months (June – November) as: Birbhum (74–88%), Bankura (74–90%), Burdwan (72–88%) and Midnapur (71–87%) (Government of West Bengal, 2005).

Rainfall

According to Peterson (1910), “During the monsoon season weather conditions in Burdwan are very similar in other parts of south-west Bengal. The rainfall is maintained chiefly by cyclonic storms which form in the north-west angle of the Bay and influence the weather over the whole of the south-west of the province, and by inland depressions which form over the central districts of Bengal and move slowly westward.”

“For successful cultivation, the most important point is the distribution of rainfall and in Burdwan, as in other districts of Bengal; the total amount is a secondary consideration. The distribution suitable for paddy – by far the most important crop of Bengal – may be gathered from the following ritual doggerels:

Verse	Meaning
<i>Ashare barsha ba the;</i>	Ashar should be a month of endless rain,
<i>Karkata chharkata;</i>	Frequent showers of rain are required in Sraban;
<i>Sinha sukana,</i>	Bhadra should be a dry month,
<i>Kanya Kane Kan;</i>	The fields should be brim-full of water in Aswin;
<i>Binabay tula barshe,</i>	If there be rain without wind in Kartick
<i>Kotha rakho dhan.</i>	Where shall I keep the paddy?”

The study on rainfall pattern for 10-year period (1996-2005) showed that the annual rainfall and percentage of it during ‘Radhunipagal’ rice growing season (June–November) in native districts were: Birbhum (1553.5 mm, 85.4%), Bankura (1341.1 mm, 83.6%), Burdwan (1440.0 mm, 81.9%), Hooghly (1354.7 mm, 82.2%), Howrah (1459.1 mm, 83.5%), Midnapur (1634.0 mm, 83.0%) and North 24 Parganas (1656.9 mm, 85.2%) (Government of West Bengal, 2005).

Radhunipagal’ paddy, being an indigenous photo-sensitive crop, is cultivated during *aman* (*kharif*) season for hundreds of years in Bengal. As per Hunter (1877) for Bardwan district, also applicable for the entire native area, “The *Aman* or *Haimantik* rice is the cold-weather crop, and, indeed, forms of the great harvest of the year. It is sown in *Ashar* or *Sraban*, corresponding to June and July, and reaped at the end of *Agrahayan* and beginning of *Paush*, or from the middle of November to the middle of December.”

Land: 'Radhunipagal', an indigenous rice of the region, has been adopted to grow in medium land during *kharif* season. The variety produces tall-statured plants with lodging tendency at hard dough or near-maturity stage, which makes the variety unsuitable in low-land situation.

c) Nursery preparation and sowing:

The optimum sowing time of 'Radhunipagal' rice is the period from the middle of *Aasahr* to the first week of *Shravana* month in Bengali calendar, i.e. from 3rd week of June to 2nd week of July during *kharif* season.

Seed rate: The recommended seed rate of 'Radhunipagal' paddy is very low (18-20 kg.) because of its small seed size (short-bold type, mean test weight 10 g) to transplant the seedlings in 1 ha. of main field.

d) Main Field Preparation and Sowing of seeds:

Peterson (1910) described the sowing of paddy seed in 'Bengal District Gazetteer, Burdwan' as: "For the nursery a plot of ground is chosen either in a corner of the field itself or in a place where water is available. It is heavily manured with well-rotted dung and ashes after careful ploughing. For sowing advantage is taken of a slight rain, or the moisture necessary for the purpose is obtained by artificial irrigation. A maund of seed is sown broadcast on a bigha of nursery land. Sometimes a little more. The field must not be watered after sowing, for this causes the soil to sink and cake, which greatly interferes with the proper germination of the seed."

The area for nursery bed is selected in medium lands, preferably having irrigation facilities, and 200-300 kg. well-decomposed cow dung manure or farmyard manure (FYM) is applied before first ploughing. The average seedbed area, i.e. about 700-1000 m² for 1 ha. main field is prepared by repeated ploughings followed by laddering to level the land. Then the area is divided into nursery beds of convenient size, usually 5-7 m length × 1-1.5 m in width, along with mud bunds around the borders keeping irrigation or drainage channels outside. About 500-600 g each of urea, single super phosphate and muriate of potash is applied in the nursery beds before sowing of seeds.

Soaked or pre-germinated seeds of 'Radhunipagal' are sown by uniform broadcast method in the nursery beds. The beds are kept wet without allowing standing water for first 3-5 days; thereafter the water level is maintained at 1-3 cm as per age of the seedlings.

Sowing time: The optimum sowing time of 'Radhunipagal' rice is the period from the middle of *Aasahr* to the first week of *Shravana* month in Bengali calendar, i.e. from 3rd week of June to 2nd week of July during *kharif* season.

Seed rate: Farmers generally use their own seeds with replacement habit of every 2-3 years. They are advised to collect the seeds from Government Farm / University Farms / KVKs / West Bengal State Seed Corporation / reputed seed companies / Agencies, etc. to ensure about the kind and quality of seeds. The recommended seed rate of 'Radhunipagal' paddy is very low (18-20 kg) because of its small seed size (short-bold type, mean test weight 10 g) to transplant the seedlings in 1 ha. main field.

Land preparation: Mukherji (1901) described the land preparation of winter rice in Bengal as: "The paddy fields should undergo regular cultivation after the commencement of the rains, ploughing being done in puddle. The object of this is to bury the grasses and weeds. Two ploughings and two cross-ploughings, followed by one laddering in each case, are enough for the field to receive seedlings."

The main field of 'Radhunipagal' rice is generally ploughed by power-tiller or country plough to a depth of 12-15 cm for 2-3 times at 3-4 days interval including final ploughing in standing water or puddled condition followed by planking to level the land. Hunter (1876) made a list of various agricultural implements used for ordinary agriculture, particularly for land preparation and bund making in rice field in medinipur district as: "(i) *nangal*, or plough; (ii) *mai*, a description of bamboo ladder, drawn over the field to level it and break the clods; (iii) *kodali* or spade;"

'Radhunipagal', an indigenous rice of the region, has been adopted to grow in medium land during *kharif* season. The variety produces tall-statured plants with lodging tendency at hard dough or near-maturity stage, which makes the variety unsuitable in low-land situation.

e) Transplanting:

As per traditional practices, "the transplanting can be commenced when the regular rainy season just sets in, i.e., about the first week of July or earlier" (Mukherji, 1901). Two-three seedlings of 25-30 days old (with 4-5 leaves) are to be transplanted in each hill at a spacing of 20 cm × 15 cm (8" × 6") and a depth of 2-3 cm. The gaps should be filled up as early as possible (within a week).

Peterson (1910) described the transplanting of paddy seedlings in 'Bengal District Gazetteer, Burdwan'as: "The seedlings are ready for transplantation when they are about a foot high. After they have been taken out their roots are well washed. They are then made into bundles, each bundles containing as many plants as can be grasped with both hands and kept floating in water..... One bigha of land will require 60 to 70 bundles of seedlings, and this is the produce of about two kathas of nursery..... The usual time for transplanting is the end of June and the beginning of July, but very much depends in this respect on the period and amount of rainfall. The seedlings are planted in the soft earth at a distance of nine to fifteen inches apart, four to five being placed together." Generally, 20-25 days old seedlings @ 2-3/hill are transplanted at a spacing of 20 cm × 15 cm in the main field.

f) Irrigation:

Mukherji (1901) described "The most favourable climatic conditions for the rice crop are: (i) premonitory showers in May, facilitating final preparation of land and sowing in seed-beds; (ii) heavy showers during June and in July, facilitating *nigarh* and weeding operations; (iii) heavy rains in September, when the *aman* is coming into ear; (iv) casual but heavy showers in October, about once a week, especially during the first fortnight."

As per Peterson (1910), "Being a crop of the rainy season *aman* rice does not generally require artificial irrigation, but in October and November, just when the plants begin to blossom, it is sometimes necessary." 'Radhunipagal' rice can tolerate short-season drought during the cropping season to some extent. However, irrigations are given, where facilities available, as per need and age of the crop.

g) Weed Control: Hunter (1876 and 1877) reported the use of *sal*, for raking up grass, weeds, etc. from ploughed land in Medinipur district, and the use of *bida*, weeder with iron teeth, dragged over the field to clear it of weeds in Bardwan district during 19th century.

Pal (2016) made a list of weeds infested in 'Radhunipagal' rice field in New alluvial Zone of West Bengal; of which most common ones were: *Echinochloa crusgalli* (Barnyard grass), *Echinochloa colona* (Jungle rice), *Paspalum distichum* (Knot grass), *Fimbristylis miliacea* (Globe fingerrush), *Cyperus difformis* (Smallflower umbrella sedge), *Cyperus iria* (Flatsegde), *Ludwigia parviflora* (Perennial water primrose), *Ammania baccifera* (Redstem), *Oxalis*

carniculata (Indian sorrel) *Alternanthera philoxeroides* (Alligatorweed) and *Marsilea quadrifoliata* (Pepperwort).

The field of 'Radhunipgal' rice is kept weed-free by two hand weeding, one at 3 WAT and another at 6 WAT. In some areas, chemical method of weed control is presently practiced due to non-availability of agricultural labours as well as to reduce the cost for weed management.

h) Water management: Mukherji (1901) described "The most favourable climatic conditions for the rice crop are: (i) premonitory showers in May, facilitating final preparation of land and sowing in seed-beds; (ii) heavy showers during June and in July, facilitating *nigarh* and weeding operations; (iii) heavy rains in September, when the *aman* is coming into ear; (iv) casual but heavy showers in October, about once a week, especially during the first fortnight."

As per Peterson (1910), "Being a crop of the rainy season *aman* rice does not generally require artificial irrigation, but in October and November, just when the plants begin to blossom, it is sometimes necessary."

'Radhunipgal' rice can tolerate short-season drought during the cropping season to some extent. However, irrigations are given, where facilities available, as per need and age of the crop.

i) Pest-disease Management :

Major insects, which infest 'Radhunipgal' rice, include: (i) yellow stem borer (*Scirpophaga incertulas*) at tillering phase and (ii) gundhi bug (*Leptocoris acuta*) at milk stage of the crop. Based on the recommendations of the State Department of Agriculture, State Agricultural University, spraying of insecticides like Carbofuran 3 G @ 25 kg or Foret 10 G @ 10 kg/ha or other chemicals or botanical extracts is done to control yellow stem borer, while Chloriopyriphos 20 EC @ 2 ml/litre of water or others against gundhi bug. As the variety has tolerance / resistance to some insects and diseases, the integrated pest management is followed.

j) Harvesting and threshing:

The crop is ready for harvest, when about 80-85 % grains become ripe and yellow in colour, usually 30-35 days after flowering of the crop. Harvesting is traditionally done by sickles *i.e kaste*. or *kachi* (Hunter, 1877) preferably during morning hours. The harvested plants are kept in the field for sun drying for about 2-3 days, then these are tied in bundles and carried to the yards of the farmers' houses, where threshing is done by pedal thresher or beating the plants on bamboo-made platform. The grains obtained after threshing are cleaned by winnowing and then stored in paddy storage structures (*marai* or *gola*) or in gunny bags. Mukherji (1901) opined that "Aman paddy need not be thrashed soon after harvesting, but kept stacked for months."

k) Yield: The average yield of 'Radhunipgal' rice is 2.2-2.5 t/ha, which varies with cultivation practices, soil types and weather conditions. Mukherji (1901) reported the outturn of 'Radhunipgal' (fine scented *Aman*) grown on *Aus* land at Sibpur Experimental Farm, Howrah during 1900 as: 7.50 lbs. grain and 1020 lbs. straw per acre.

l) Storage: According to O'Malley (1909), "After threshing the paddy is winnowed and stored in thatched granaries with split bamboo walls (*marai*). There is a system of long-term storage of 'Radhunipgal' paddy for better quality of cooked rice and more market price.

m) Nutrient management:

Radhunipagal' rice is grown under traditional organic nutrient management system for more than two hundreds years, which slowly comes under limited chemical fertilizer-based farming or integrated nutrient management system during the period of last 20-30 years.

As per Peterson (1910), "Manuring is not practiced in its cultivation, but in some places the more intelligent cultivators used 20 baskets of cowdung or a mound of oil-cake per bigha just before transplanting the seedlings." Similar opinion of Mukherji (1915) was recorded as: "*Aman* land is seldom manured, but manuring with oil-cakes, at three maunds per acre, would generally give a better yield, and perhaps pay for the outlay by the increased out-turn." In the context, Peterson (1910) mentioned that "Cowdung is considered the manure, and the Bengali term of manure is synonymous in which it is held by the popular rural saying, '*sar satya Lakshmi*'— cowdung is the real Lakshmi (goddess of fortune)."

Generally, 3-5 t/ha. of well-decomposed cow dung or FYM, depending on availability, is incorporated in the soil before the first land preparation. In case of non-availability of cow dung manure for application as basal, vermicompost @ 1-2 t/ha may also be a good alternative option. Besides, green manuring with *dhaincha* has a beneficial effect on crop production and grain quality along with soil health. Based on soil fertility status under varied land situations in different blocks of native districts, 30-50 kg N, 15-25 kg P₂O₅ and 15-25 kg K₂O/ha. is applied; wherein entire phosphate, one-fourth nitrogen and three-fourth potash are given as basal, half nitrogen at 3 weeks after transplanting (WAT) as first top dressing, and rest one-fourth nitrogen and one-fourth potash at 6 WAT as second top dressing. In some areas, farmers use mustard cake for top dressing the crop for better production and quality.

n) Traditional methods of Production:

Farmers in native areas cultivate 'Radhunipagal' paddy following traditional methods intermixed with a few modern techniques to get potential yield of the crop with sustained grain quality. The area expansion programme for 'Radhunipagal' rice has been going on with supply of seeds under technical support of RKVY Project on 'Bengal aromatic Rice' of BCKV, and the State Department of Agriculture during last 10-12 years.

Soil

'Radhunipagal' rice is traditionally cultivated in *gangetic* and *vindya* alluvial soil adjacent to the rivers like the Ganges (Bhagirathi), Damodar, Kansabati, Mayurakshi, Rupnarayan, Ichhamati, etc. in South Bengal region, and it is also adaptable in laterite soil in western part of the state (Ghosh, 1963).

The soil of native districts is basically old and new-alluvium type, comprising mostly coarse and fine silt. The soil is generally acidic or neutral in nature along with low to medium organic carbon content. The available nitrogen, phosphorus and potassium in soil were mostly in the category of low to medium, but the available sulphur content was usually medium to high. Besides, the soil is generally non-deficient or slightly deficient in available zinc and boron content.

Season and Climate

Hunter (1877) gave a brief idea about the climatic condition of Burdwan district in his book, 'A Statistical Account of Bengal: Districts of Bardwan, Bankura and Birbhum' as: "The climate of Bardwan may be divided into three seasons, – the cold season, ranging from about the middle of October to the middle of February; the hot season, ranging from about the middle of February to the middle of June; and the rainy season, from about the middle of June to the

middle of October.” ‘Radhunipagal’, being a photo-sensitive crop, is cultivated as a monsoon-dependent crop during *kharif (aman)* season only.

Rainfall: According to Peterson (1910), “During the monsoon season weather conditions in Burdwan are very similar in other parts of south-west Bengal. The rainfall is maintained chiefly by cyclonic storms which form in the north-west angle of the Bay and influence the weather over the whole of the south-west of the province, and by inland depressions which form over the central districts of Bengal and move slowly westward.”

The study on rainfall pattern for 10-year period (1996-2005) showed that the annual rainfall and percentage of it during Radhunipagal rice growing season (June–November) in native districts were: Birbhum (1553.5 mm, 85.4%), Bankura (1341.1 mm, 83.6%), Burdwan (1440.0 mm, 81.9%), Hooghly (1354.7 mm, 82.2%), Howrah (1459.1 mm, 83.5%), Midnapur (1634.0 mm, 83.0%) and North 24 Parganas (1656.9 mm, 85.2%) (Government of West Bengal, 2005). As ‘Radhunipagal’ is one of the *aman* varieties of rice, it needs moderate rainfall for the cultivation.

Temperature: According to Peterson (1910), “there is a steady fall until the monsoon is established when the average day temperature remains steady at about 90° F till October. Night temperature remains almost unchanged until September when it begins to fall, and is 75° F in October, 64° F in November.”

Mean monthly-average maximum and minimum temperature in different native districts of ‘Radhunipagal’ rice during 2005 was found to vary among 6 months (June–November) as: Birbhum (29–38°C and 15–27°C), Bankura (29–39°C and 16–28°C), Burdwan (29–38°C and 16–27°C) and Midnapur (28–38°C and 17–28°C) (Government of West Bengal, 2005).

Humidity: Mean monthly-average relative humidity at 8.30 A.M. at different district head-quarters during 2005 was found to vary among 6 months (June – November) as: Birbhum (74–88%), Bankura (74–90%), Burdwan (72–88%) and Midnapur (71–87%) (Government of West Bengal, 2005).

J) **Uniqueness:**

- Radhunipagal is a popular **aromatic rice** variety among others.
- Being non-Basmati type rice, it is so fragrant & delicious that cooks could not resist him/herself eating up such a dish made up of this rice.
- Landrace Radhunipagal paddy has also the capability of **stress tolerance**.
- It has some medicinal properties also as it is a **Fe (iron) and Zn (zinc) -rich rice variety**. ‘Radhunipagal’ is a very popular indigenous small-grained aromatic rice in West Bengal because of its use mainly in preparation of ‘payesh’ (dessert), ‘bhog’ and ‘pitha’ (hand-made cakes) particularly during social functions and religious festivals.

The milled rice of ‘Radhunipagal’ packed in gunny (jute-made) or polythene bags of 30 kg capacity is sent by the millers or traders to the domestic markets and it is sold as loose rice as per need of the consumers. The RKVY Project on ‘Bengal Aromatic Rice’ of Bidhan Chandra Krishi Viswavidyalaya, West Bengal developed a promotional strategy through model value-chain network of ‘Radhunipagal’ rice and released a ‘Radhunipagal rice packet’ of 1 kg capacity in the Inaugural Session of National Seminar on ‘Sustainable agriculture for food security and better environment’ at Farmers’ Academy and Convention Centre, B.C.K.V., Kalyani, Nadia, west Bengal on 17.12.2015 (BCKV, 2016) towards its better marketing system .

DNA fingerprinting-based Molecular Characterization

The molecular characterization of 'Radhunipagal' rice was done under technical supervision of Dr. T.K. Ghose at the Division of Plant Biology, Bose Institute, Kolkata, West Bengal during 2006-2008. 3-day old rice seedlings of 'Radhunipagal' along with international check (IR 36) of each genotype were used for genomic DNA isolation according to the method of Walbot (1988). DNA amplification was carried out by standard PCR method with 23 pairs of SSR markers in a Peltier Thermal Cycler (MJ Research, USA). The PCR products were resolved by native polyacrylamide gel electrophoresis (PAGE) following the protocol given by Sambrook *et.al.*(1989). The length of the amplified DNA bands (SSR alleles) from two rice genotypes was determined with the reference of 50 bp DNA ladders (SibEnzyme Ltd., Russia) by the Molecular Analyst software (BioRad, USA).

The different alleles amplified from the genomic DNA of 'Radhunipagal' rice along with the check were identified on the basis of their length or base pairs (bp) (Table 4.3) for making genetic characterization of 'Radhunipagal', native aromatic landrace of old alluvial agro-climatic zone of West Bengal.

Details of SSR markers and base pair length of 'Radhunipagal' rice

SSR Marker	Motif	Rice Chromosome No.	Annealing temperature (°C)	Length of base pair (bp)	
				'Radhunipagal'	IR 36 (International check)
RM 42	(GA)6	8	65	154.85	156.36
RM44	(GA)16	8	55	108.71	112.78
RM72	(TAT)5C(AT T)15)	8	55	148.50	165.65
RM80	(CTT)20	8	65	118.28	121.82
RM112	(GAA)5	2	55	130.16	141.98
RM149	(AT)10	8	59	261.98	246.99
RM152	(GGC)10	8	60	141.71	149.96
RM182	(AT)16	7	59	293.84	296.27
RM207	(GA)25	2	65	149.13	128.48
RM210	(GA)23	8	55	13.58	149.75
RM218	(GA)24	3	55	150.30	155.29
RM223	(GA)25	8	55	148.11	164.34
RM250	(CT)17	2	60	156.25	150.96
RM251	(CT)29	3	55	114.22	119.88
RM282	(GA)15	3	59	132.28	140.39
RM284	(GA)8	8	55	146.68	139.68
RM310	(GT)19	8	55	106.37	107.57
RM337	(CTT)4-19(CTT)8	8	59	156.31	161.29
RM339	(CCT)8(CCT 9CCT)5	8	59	183.95	143.09
RM341	(CTT)20	2	55	138.38	174.97
RM505	(CT)12	7	55	123.44	126.25
RM530	(GA)23	2	59	156.99	168.02
RM569	(CT)16	3	59	161.45	167.61

Among 35-40 traditional non-Basmati type scented rice landraces of West Bengal, 'Radhunipagal', is most favoured in domestic market of 'rarh' (lateritic) and lower gangetic region of West Bengal for its excellent quality features. In Bengali, 'Radhuni' means the lady cook and 'pagal' is termed for mad people. Hence, the name 'Radhunipagal' was given to this variety by the people of native region as the smell of rice after cooking maddens the cook, or 'cook maddening aroma' as referred in a book 'A Dictionary of the Economic Products of India' written by Watt (1891) about 130 years ago. W.W. Hunter (1876) described "radhani-pagal, -this name means literally, 'that which maddens the cook', and implies that cooks cannot restrain themselves from eating up so fragrant a dish." It is fact that 'Radhunipagal' rice has aroma in its different parts at different stages like seedling stage in nursery (leaf), tillering stage in main field (leaf and tiller), flowering stage (spikelet) (Ghosh *et al.*, 2003), ripening stage (developing grain), maturity stage (paddy grain), milling stage (milled rice) (Pal, 2015 and Bera, 2019), cooking (cooked products). 'Radhunipagal' rice is traditionally used for preparation of *payesh*, *bhog / khicdi*, *polao*, *pitha*, etc. during religious festivals and social functions in the native region (Ghosh, 2019). Besides, 'Radhunipagal' as a paddy landrace has also the capability of tolerance to moisture stress and it is less infested by insects and diseases.

Distinguishable plant characteristics of 'Radhunipagal' rice:

Sl. No.	Characteristics	Code	Description with mean value
1	Time of heading (50% of plants with panicles)	7	Late (122 days)
2	Leaf : length of blade	7	Long (70.0 cm)
3	Leaf : width of blade	3	Narrow (0.98 mm)
4	Leaf sheath : anthocyanin colouratin	9	Present (inner side of lower leaf sheath)
5	Stem: thickness	5	Medium (0.52 cm)
6	Stem: length (excluding panicle)	5	Medium (129.3 cm)
7	Spikelet : colour of stigma	4	Light purple
8	Panicle: number per plant	3	Few (9.57)
9	Panicle: curvature of main axis	7	Drooping
10	Spikelet: colour of tip of lemma	5	Purple
11	Lemma & Palea : Colour	7	Purple spots / furrows on straw
12	Sterile lemma: colour	4	Purple
13	Grain : length	1	Very short (5.78 mm)
14	Grain : width	2	Narrow (2.35 mm)
15	Grains: weight of 1000 fully developed grains	1	Very low (10.03 g)
16	Time of Maturity	7	Late (151 days)

Traditional practices during 19th – 21st Century:

Milling

The 'dhenki' method of rice husking is a century-old traditional milling system, which been largely replaced by mechanized rice milling of various forms from small husking machine to a few large automated mills during last 70-80 years.

'Radhunipagal' is cultivated in different districts in southern region of West Bengal, but its area-coverage and production is mostly found in the districts of Birbhum, Bankura, Burdwan, Hooghly, Purulia, etc. during last 3-4 decades.

Marketing

'Radhunipagal' is a very popular indigenous small-grained aromatic rice in West Bengal because of its use mainly in preparation of 'payesh' (dessert), 'bhog' and 'pitha' (hand-made cakes) particularly during social functions and religious festivals.

The milled rice of 'Radhunipagal' packed in gunny (jute-made) or polythene bags of 30 kg capacity is sent by the millers or traders to the domestic markets and it is sold as loose rice as per need of the consumers. The RKVY Project on 'Bengal Aromatic Rice' of Bidhan Chandra Krishi Viswavidyalaya, West Bengal developed a promotional strategy through model value-chain network of 'Radhunipagal' rice and released a 'Radhunipagal rice packet' of 1 kg capacity in the Inaugural Session of National Seminar on 'Sustainable agriculture for food security and better environment' at Farmers' Academy and Convention Centre, B.C.K.V., Kalyani, Nadia, West Bengal on 17.12.2015 (BCKV, 2016) towards its better marketing system (Plate 13 and 14).

The following Farmers' Organizations engaged in Marketing of Radhunipagal Rice through technical support of BCKV:

District	Farmers Organization
Nadia	Rupali Farmers, Club, Maheswarpur, Block Chakdaha
	Krishnagar Agricultural Development & Producer Organization (Trust), Naduria, Block Krishnagar I
	Ushagram Trust, Birnagar, Block Ranaghat I
Purba Bradhaman	Siksha Niketan, Kalanabagram, Block Memari I
Birbhum	Dr. Md. Kudrat-E-Khuda Gramin Vigyan O Projukti Bikash Kendra, Margram, Block Rampurhat I
Bankura	Dalpur Sree Sree Gyananda Saraswati Ashram, Dalpur, Block Chhatna
Howrah	Jhamtia Nabachetana, Jhamtia, Block Amta II
North 24 Parganas	Apur Krishak Samity, Ichapur, Block Gaighata

The price of 'Radhunipagal' rice depends on the cost of cultivation, milling charges, profit-sharing in field-to-market network, demand-supply status, etc. As per survey-based retail market information, the price of milled 'Radhunipagal' rice goes up steadily from Rs. 35-40 per kg. to Rs. 60-70 per kg for varied grades or quality during last 5-6 years.

K) Inspection Body:

- 1) Representative of Vice Chancellor, B.C.K.V., Mohanpur, Nadia
- 2) Director of Agriculture, Directorate of Agriculture, Government of West Bengal.
- 3) Additional Director of Agriculture (Research), West Bengal, Directorate of Agriculture, Govt. of West Bengal.
- 4) Director of Agricultural Marketing, Govt. of West Bengal, Kolkata
- 5) Joint Director of Agriculture (Rice Development), Rice Research Station, Chinsurah, Hooghly, Govt. of West Bengal.
- 6) Managing Director, Paschimbanga Agri. Marketing Corporation Ltd., Govt. of West Bengal
- 7) Representative, Department of Agronomy, B.C.K.V., Mohanpur, Nadia, West Bengal.
- 8) Representatives of Patent Information Centre (PIC), West Bengal State Council of Science & Technology, Govt. Of West Bengal.

- 9) Representatives of U.B.K.V., Pundibari, Coochbehar, West Bengal.
- 10) Two Technical Expert for GI from B.C.K.V. nominated by Vice Chancellor, B.C.K.V., Nadia

Internal Watch dog mechanism

In order to maintain the quality and for regulating the use of GI in the native region, there will be a well-structured two-tier monitoring system for 'Radhunipagal rice', wherein a 'State-level Monitoring Committee' at the top and 'District-level Inspection Team' at base level. Mandatory activities for Farmers / Authorized Users for 'Radhunipagal rice' will be taken from time to time. The State-level Monitoring Committee will discuss on policy issues, inspection methods, strategic plan, implementation schedule, etc. related to production, processing and trading of 'Radhunipagal' rice and the use of approved GI logo. The 'District-level Inspection Team' will be formed involving the selected persons of the concerned districts to monitor on seed production, grain production, milling, supply-chain, quality issues, etc.

State-level Monitoring Committee

- (1) Director of Agriculture or Representative, Directorate of Agriculture, Govt. of West Bengal
- (2) Director of Research or Representative, Bidhan Chandra Krishi Viswavidyalaya, Nadia
- (3) Director or Representative, SAMETI, Govt. of West Bengal, Narendrapur, South 24 Parganas
- (4) Joint Director of Agriculture (Rice Development) or Representative, Rice Research Station, Govt. of West Bengal, Chinsurah, Hooghly
- (5) Deputy Director of Agriculture (Seed Certification) or Representative, Dept. of Agriculture, Govt. of West Bengal
- (6) One Technical Expert on Rice, Bidhan Chandra Krishi Viswavidyalaya, Nadia
- (7) Managing Director or Representative, PAMCL, Govt. of West Bengal
- (8) Nodal Officer or Representative, Patent Information Centre, Govt. of West Bengal
- (9) Regional Head or Representative, APEDA, Eastern Region, Kolkata, West Bengal

District-level Inspection Team

- (1) Deputy Director of Agriculture (Admn.) or Representative of concerned district
- (2) One Technical Expert on Rice from Bidhan Chandra Krishi Viswavidyalaya
- (3) Senior Scientist & Head or Representative of KVKs of concerned district
- (4) Assistant Director of Agricultural Marketing or Representative of concerned district
- (5) Assistant Director of Agriculture (Seed Certification) of concerned district
- (6) Assistant Director of Agriculture (Admn.) of concerned blocks
- (7) One Representative from Rice Millers' Association of the concerned district

L) Others:

Recent Quality and Socio Economic Profile:

Agriculture, since the dawn of human civilization, continues to play an important role in society, region, country and world as a whole. At present, it is important for domestic food-sufficiency, rural employment generation, export earning, etc.

India, particularly the eastern India including West Bengal, is the region or place of origin of large number of rice landraces comprising mostly non-aromatic types along with some scented ones. Watt (1891) gave a brief idea about the varieties and races of Bengal rice in his book

entitled, 'A Dictionary of the Economic Products of India' as: "Some few years ago the writer was directed by the Government of Bengal to take over temporary charge of the Economic Museum, Calcutta, with the view to reorganizing and naming its collections. About the same time he was also, by the Government of India, placed in-charge of the Central office of the Calcutta International Exhibition. In these two capacities, he had the opportunity of examining a very extensive series of specifications of rice, numbering over 4,000. The total number of named cultivated rice might have been found to be little short of 10,000."

The glory of scented rice landraces including '*Radhunipagal*' in the society and culture of Bengal along with its commercial importance in the national and international market network can be summarized as:

- i. The state of West Bengal has precious wealth of genetic diversity in aromatic rice (Singh *et al.* 2000; Shobharani and Krishnaiah, 2001). Among 35-40 scented rice landraces, '*Radhunipagal*' is very popular in domestic market for hundreds of years and probably potential for International trade.
- ii. West Bengal, at present, ranks first in rice production within the country, with some surplus. Thus, Government of West Bengal promotes to produce high-value rice during last 5 years considering the growing market.
- iii. India is the second largest exporter country in the World. In the back ground, future strategy to bring some non-Basmati traditional aromatic varieties to the knowledge of the consumers abroad would help to find small but assured market (Siddiq, 2002).

The price of '*Radhunipagal*' rice depends on the cost of cultivation, milling charges, profit-sharing in field-to-market network, demand-supply status, etc. As per survey-based retail market information, the price of milled '*Radhunipagal*' rice goes up steadily from Rs. 35-40 per kg. to Rs. 60-70 per kg. for varied grades or quality during last 5-6 years.

b) Economics of production:

Based on the primary survey in the districts of Birbhum, Bardhaman, Bankura and Hooghly during 2016- 2017, the economics of production of *Radhunipagal* rice estimated by B.C.K.V. has been mentioned in a

Book entitled '*Radhunipagal Dhan: Utpadan, Prakriyakaran o Bipanan*' (in Bengali) published in 2018.

Uses:

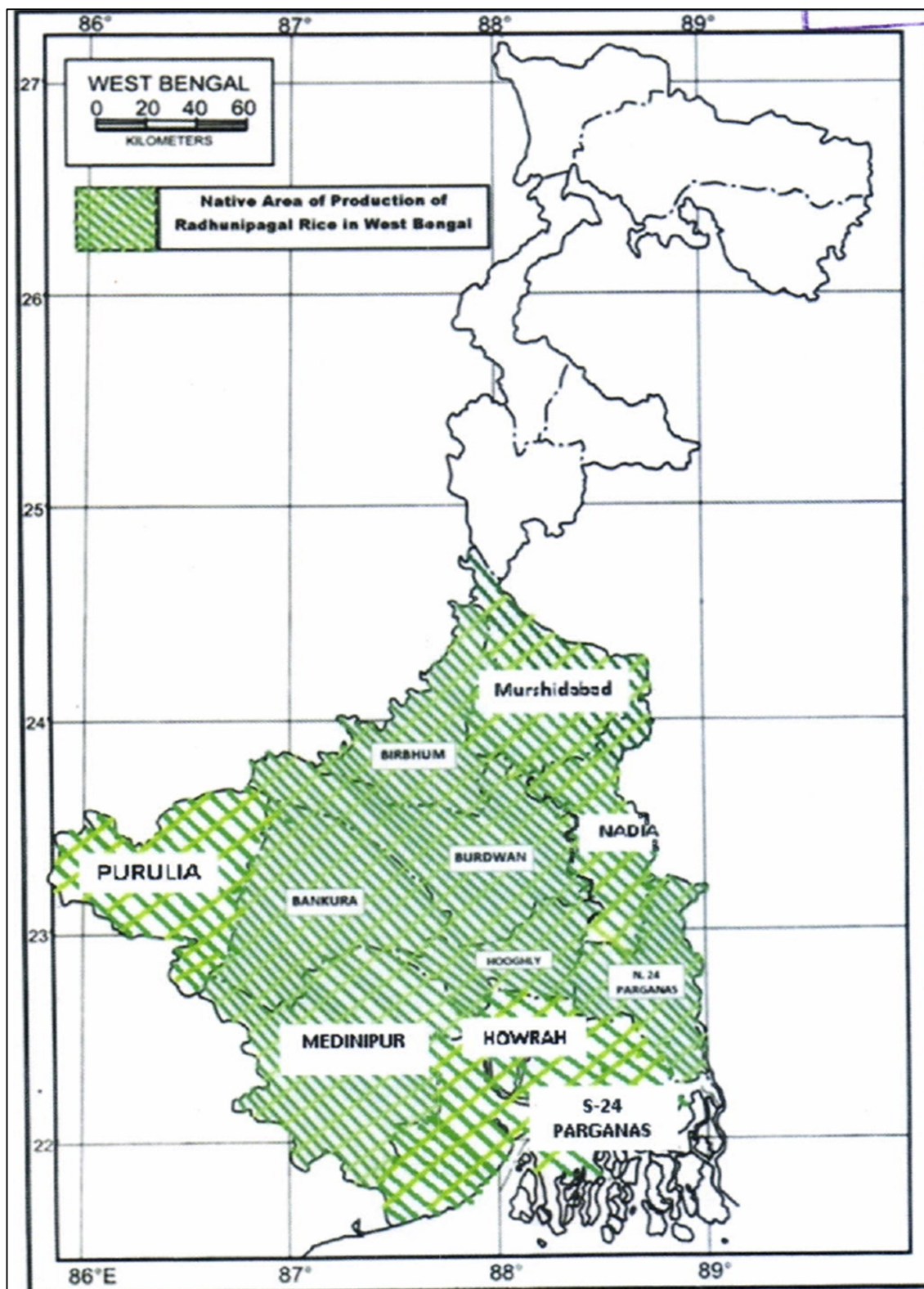
'*Radhunipagal*' is a non-Basmati type indigenous aromatic rice of West Bengal. It has short-bold type, white kernels with desired cooking quality and pleasant aroma. The raw milled rice of '*Radhunipagal*' has different forms of use like:

(a) *Bhog* and *Bhat* (boiled rice): The soft-textured raw (*atap*) rice of '*Radhunipagal*' is intermixed with *dal* (pulses) to prepare *bhog* or *khichdi*, which is used during *puja* or religious festivals.

The *bhat* (ordinary raw boiled rice) is also delicious along with *ghi* (semi-liquid butter) to the Bengalee people, particularly to the vegetarians in the region for a long period.

(b) *Payesh* (dessert): *Payesh* (dessert), the milk-based food item, is very popular among the people of eastern and northern India. It is specially prepared in social functions like religious festivals (*puja*), birthday, '*bhaiphonta*' (Brothers'day), etc.

(c) *Pistak* or *Pitha* (Home-made cakes): *Pistak*, made from rice flour, has been mentioned in District Gazetteers of Bardwan (Hunter, 1877) of West Bengal.



Map showing the native region of production of ‘Radhunipagal’ rice

G.I. APPLICATION NUMBER – 1051

Application Date: 02-02-2023

Application is made by 1. Tamil Nadu State Agricultural Marketing Board at Chief Executive Officer, Thiru Vi Ka Industrial Estate, Guindy, Chennai - 600 032, Tamil Nadu, India and 2. Ramnad Chithiraikar Rice Farmer Producer Association at Door no – 1-7-3, Ammapattinam, Pudhumandabam, District: Ramanathapuram – 623 524, Tamil Nadu, India for Registration in Part - A of the Register of **Ramanadu Chithiraikar Rice** under Application No. 1051 in respect of Rice falling in Class – 31 is hereby advertised as accepted under Sub-section (1) of Section 13 of Geographical Indications of Goods (Registration and Protection) Act, 1999.

A) Name of the Applicant : 1. Tamil Nadu State Agricultural Marketing Board,
2. Ramnad Chithiraikar Rice Farmer Producer Association

B) Address : 1. Tamil Nadu State Agricultural Marketing Board at Chief Executive Officer, Thiru Vi Ka Industrial Estate, Guindy, Chennai - 600 032, Tamil Nadu, India and
2. Ramnad Chithiraikar Rice Farmer Producers Association at Door no – 1-7-3, Ammapattinam, Pudhumandabam, District: Ramanathapuram – 623 524, Tamil Nadu, India

Facilitated By:
NABARD Madurai Agri Business Incubation Forum, Madurai

C) Name of the Geographical Indication :

RAMANADU CHITHIRAIKAR RICE



D) Types of Goods : **Class 31 – Rice**

E) Specification:

Ramanadu Chithiraikar Rice is a traditional red rice variety grown in the Chithiraikar district. Known for its distinctive appearance and strong local adaptation, this rice has several unique characteristics and benefits that make it highly valued by local farmers and consumers. Here's a detailed look at the key features of this rice variety:

Characteristics of Ramanadu Chithiraikar Rice:

Grain Appearance:

The rice has bold and round grains, making it visually distinct from other varieties. The outer skin of the grain is slightly dark and has a black color, while the inner grain is red. This coloration is one of the most notable features, adding to its unique appeal.

Kanji (Rice Porridge):

The kanji (rice porridge) made from this rice is particularly popular and is appreciated for its good taste. The rice's ability to prevent hunger for several hours makes it a staple in many households, particularly in the form of a hearty, filling porridge.

Yield:

The seed rate for direct sowing is 40-50 kg per acre, and the typical yield is 1,500-1,800 kg per acre under normal monsoon conditions. In years with poor monsoon (water scarcity), the yield can still be substantial, ranging between 600-900 kg per acre. This rice is also known for being a very good straw yielder, producing around 2 tonnes per acre.

Duration and Sowing/Harvesting Period:

The crop typically has a duration of 120 days from sowing to harvest. It is generally sown in the month of Aavani (September) and harvested in Thai (January). This timing ensures that the rice is grown in alignment with the traditional agricultural calendar of the region.

Nutritional Value:

The Chithiraikar rice is considered to be highly nutritious, making it an excellent choice for traditional foods like dosa and idli. Its nutritional profile is one of the factors that contribute to its sustained popularity.

Pest and Disease Resistance:

This rice variety is generally resistant to pests and diseases, which makes it suitable for sustainable farming practices. However, under stressful conditions such as water scarcity, it may be affected by the leaf folder pest.

Traditional Farming Practices:

Most local farmers in the region prefer cultivating this landrace variety due to its resilience and suitability to the local climate and soil conditions. Farmers also save seeds from previous harvests to sow in the next season, preserving the genetic integrity of the variety.

Market Price:

The price of the harvested rice is typically determined by market demand. This price varies based on the harvest yield and market conditions.

Adaptation to Local Conditions:

The Chithiraikar rice has been specially adapted to the conditions of the Chithiraikar district, making it a significant part of local agriculture. It thrives in the region's environment, and local farmers continue to rely on this traditional variety more than others due to its reliability and suitability for the area.

The Ramanadu Chithiraikar Rice is an important traditional crop in the Chithiraikar district. With its bold, round grains, high nutritional value, and good pest resistance, it offers substantial

benefits to local farmers. Its unique characteristics, such as the dark outer skin and red inner grain, along with the distinctive flavor of its kanji, make it a staple in local diets. The rice variety's adaptability, yield, and low-maintenance cultivation methods make it a valuable and sustainable crop for the region, ensuring its continued importance in the local agricultural landscape.

F) **Description:**

Chitrakar was the early existing red rice variety in Thirupullani tracts of Ramnad district. The rice variety was totally failure in 1964 famine. Thereafter Chitrakar was brought from nearest "Sikkal" village and are being cultivated now. Peasants generally name all these local cultivars in the name of mattai or norungan. This variety is suitable for coastal sandy soils. It is the drought resistant and tall variety. The outer skin is slightly dark. The inner grain is bold and round. The rice kanji of this variety is good in taste. It prevents hunger for several hours. It is resistant to pests and diseases generally, except in water less times. It is affected by leaf folder in stress conditions. The cost of cultivation is less than Rs.1500. They applying only urea to the crop and only one weeding is performed during season. The seed rate is 40-50 kg per acre for direct sowing. The yield is 1000kg/acre and it fetches higher price because the local people like red rice variety more than other fine rice varieties. It is a very good straw yielder (2 tones per acre). The duration of the variety is 120 days. It is sown normally in the middle of Puratasi (September) and harvested in the month of Thai (January).

"Sivappu Chitraikar" is the traditional red rice variety grown in Paramakudi tracts. The outer skin is slightly black in colour and the inner skin is red in colour. It is the drought resistant and tall variety. The duration of the crop is 120 days and it is normally sown in the month of "Aavani" and harvested in the month of "Thai". The seed rate is 40-50 kg per acre for direct sowing. The yield is 1500-1800 kg per acre in normal monsoon period and in the failure of monsoon at least 600-900 kg per acre grains are harvested. So the farmers mainly rely on these traditional varieties rather than other varieties. The price of each bag is determined based on demand in market (Rs.300 to Rs.450). In the very lesser rain fed period there is small blight like formation found in the crop and ultimately lead to "Soorainookadu" (Sheath blight) disease. One or two weeding is performed in the field. "Rice kanji" of sivappu chitraikar is very tastier than other red rice varieties. It is good for preparation of dosai and idli. The seeds of this variety are stored by farmers from the previous harvest.

Special characteristics: It is a drought resistant and tall variety. It is highly resistant to pests and diseases. The cost of cultivation for this variety is less than Rs.1500.

Polished Chithirai Kar Rice

Linkage to geographical region: This variety is suitable for coastal sandy soils. It is a landrace, which means that it is specifically adapted for the local region.

Chemical and Physical Characteristic of Ramanadu Chithiraikar Rice

Class	Chithiraikar
Acyl halides (1)	-
Alkaloids and derivatives (1)	-
Alkyl halides (1)	-
Aspidosperma tan-type alkaloids (1)	0.06
Azoles (1)	-

Benzene and substituted derivatives (7)	0.53
Benzothiazoles (1)	-
Carbothioic S-acids (1)	-
Carboxylic acids and derivatives (3)	-
Coumarins and derivatives (1)	0.02
Dihydrofurans (1)	-
Dioxanes (1)	-
Dioxolanes (1)	-
Fatty Acyls (21)	56.32
Furans (1)	-
Furofurans (1)	-
Glycerolipids (1)	1.75
Hydroxy acids and derivatives (1)	0.9
Imidazopyrimidines (1)	-
Lupin alkaloids (1)	0.26
Naphthopyrans (1)	-
Organic phosphonic acids and derivatives (1)	-
Organonitrogen compounds (1)	-
Organoxygen compounds (22)	0.32
Phenols (2)	0.18
Prenol lipids (15)	2.06
Purine nucleosides (2)	-
Pyridines and derivatives (1)	-
Quinolines and derivatives (2)	-
Saturated hydrocarbons (9)	0.63
Steroids and steroid derivatives (23)	22.93
Thiols (1)	-
Triazole ribonucleosides and ribonucleotides (1)	0.15
Unsaturated hydrocarbons (2)	-
Total compounds yield (%)	86.11

*Number of compounds in each class is mentioned in parenthesis.

Detailed agronomic characteristics of the selected traditional rice.

Name of the variety	Chithiraikar
Origin	Tamil Nadu, India
Pedigree	Unknown
Duration (Days)	110–115
Average height (cm)	165
Number of grains per ear head	210–215
Yield of grain (kg acre ⁻¹)	1,000
Yield of straw (kg acre ⁻¹)	950
1,000 grain weight (g)	33
Color of pericarp	Red

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Color of pericarp	Red

G) Geographical area of Production and Map as shown in page no:

Ramanadu district is situated in Western Ghats, the total area of Ramnad 4.123 km. It is located in 10.997455 latitude and 76.991592 longitude:

This district is located between 9°05' and 9°50' North latitude and 78°10' and 79°27' East longitude. It is bordered by Virudunagar and Tuticorin districts to the West and Sivagangai and Pudukkottai districts to the North. To the East and South, its boundaries are formed by the Palk Bay and the Gulf of Mannar

Blocks	Mandapam and Thiruppullani
Villages	Uchipuli, Naraiyurani, Agathiarkottam, K.B.Valsai, manangudi, Nochiyurani, Pudumadam, Thamaraikulam, melmangundu, keela Mangundu, Rettaiyurani, Karan Kumbaram, Nathagulam, Regunathapuram, Salaithottam, Kalimangundu, Thinaikulam, Vannangundu,

H) Proof of Origin (Historical records):

The Ramanadu Chithiraikar Rice has a rich history rooted in the agricultural traditions of the Chithiraikar district. This traditional rice variety is deeply linked to the region's culture and local farming practices. Here is a brief history of Ramanadu Chithiraikar Rice:

Origins and Development:

Ramanadu Chithiraikar Rice is considered a landrace, meaning it is a traditional, locally-adapted variety that has evolved and thrived in the region over generations. The rice has been cultivated in the Ramanadu region (which encompasses parts of the Chithiraikar district) for centuries, making it a crucial part of the agricultural heritage of the area.

The rice variety has adapted well to the local environmental conditions, including the climate and soil of the district. This adaptation is a result of farmers selectively growing the rice over many generations, which has enhanced its resilience and suitability for the region's agricultural practices.

Cultural and Agricultural Significance:

The Chithiraikar rice has long been a staple for the local communities in the Ramanadu region, particularly in the preparation of traditional foods such as dosa and idli. Its unique nutritional

qualities, combined with its high yield, have made it a favored variety among local farmers for centuries.

Historically, this rice has been cultivated using traditional farming methods, with minimal reliance on modern agricultural inputs such as fertilizers and pesticides. Instead, the farmers have followed age-old practices of direct sowing and crop rotation, which have helped preserve the integrity and purity of the rice variety over the years.

Role in Local Economy:

The Ramanadu Chithiraikar Rice has played a central role in the local economy of the Chithiraikar district. It is grown predominantly by small-scale farmers, who rely on this traditional crop for both subsistence farming and market sales.

The rice has always been valued not only for its nutritional benefits but also for its economic importance. The rice's market price varies according to demand, but it consistently holds value due to its specialized nature and high quality. Local farmers often save seeds from one harvest to plant the next, preserving the variety's continuity and ensuring its cultivation from generation to generation.

Challenges and Preservation:

Over the years, modern rice varieties and commercial farming practices have threatened the cultivation of traditional varieties like the Ramanadu Chithiraikar Rice. However, despite the encroachment of hybrid rice and industrial-scale farming, many local farmers continue to grow this rice, driven by its resilience, flavor, and cultural significance.

Efforts have been made in recent years to preserve and promote traditional rice varieties like the Chithiraikar rice. There has been a renewed focus on maintaining seed banks, promoting organic farming, and supporting sustainable agricultural practices to ensure that these ancient crops are not lost to modernization.

The Ramanadu Chithiraikar Rice has a long and storied history, having been cultivated by farmers in the region for centuries. Its resilience, nutritional value, and cultural significance make it an important part of the agricultural landscape in the Chithiraikar district. Though modern agricultural practices have introduced challenges to its cultivation, the rice continues to be a treasured crop, deeply embedded in the agricultural heritage of the region. Efforts to preserve and promote this variety ensure that it remains a vital part of both the local economy and culinary traditions.

1. **“The Agricultural Ledger - 1910”** A literature on the races of rice in India – *Oryza sativa* –compiled in the “Office of the Reporter on economic products to the Government of India”.
2. **Traditional Agricultural Practices -Applications & Technical Implements** - Published on 2010 from the Department of Agricultural Extension & Rural Sociology, Agricultural college & Research Institute, Madurai.

I) **Method of Production:**

Rainfall pattern:

North East Monsoon is the Main source of Irrigation water. Average annual rainfall is 827.0 mm, Average Winter Rainfall-67.4 mm; Summer-122.7 mm; South West Monsoon- 135.3 and North East Monsoon Rainfall-501.6 mm.

Soil:

The soils of Ramanathapuram District can be assorted into the main types viz., clay, coastal alluvium, sandy loam, alluvium, sandy and red soil clay, and black cotton soil.

Cropping pattern:

The total cropped area of the district/ zone is 172469 hectares (as per 2016-17 G-return). The area under irrigated agriculture is 63800 Hectare, while 137099 hectares is under rain fed Agriculture. The major food grain crops cultivated are Paddy, cholam , cumbu , Ragi and Blackgram. Cotton is the major non-food crop grown.

Temperature:

The average maximum temperature ranges between 29.2° to 37.8° C and the minimum between 19.5° to 24.8° C.

Coastal saline:

The problem of salinity exists both in coastal areas and inlands. The soils of coastal areas offer many unique problems like salinisation, water logging, clay pan formation and sea water inundation. These soils occur all along the east coast from Chingleput, South Arcot, Tanjora, Ramnad to Tirunelveli. It has been estimated that about one lakh hectares in the coastal belt pose salinity problems [18]. In the coastal area bordering Thanjavur district, salinity problem exists in parts of the talukas of Sirkali, Mayuram, Nagappatinam, Pattukottai and Thrithuraipoondi. The entire area is cultivated mainly to long duration rice crop, except in Sirkali taluka where double crop is followed. In all other talukas, only a single crop of rice is raised. In certain areas of Thiruthuraipoondi local rice variety 'Kar' is raised and only panicles are harvested due to water stagnation. Salinity problem exists in the talukas of Tiruvandari, Ramanathapuram and Mudukalathur in Ramanathapuram district. Most of the area in this belt is mono cropped to rice both under irrigated and rainfed conditions. In the coastal belt from Ramanathapuram to Mandapam, a fragipan has developed about 30 cm below the soil surface and rice is grown under semidry conditions in such soils [18]. It has been reported by Gillespie [44] that 400 traditional varieties have been slowly replaced by HYVs, narrowing the number to hundreds. This has led to the loss of the genetic pool of many landraces that can adapt to the ongoing climate change in Tamil Nadu. Tamil Nadu has now been left with nearly a hundred traditional landraces of paddy that have the capability to cope with ongoing climate change in Tamil Nadu.

Traditional practices related information

The cost of cultivation is less than Rs.1500. The farmers apply Urea to the crop only one time and weeding is done only once during one season. The seed rate is 40-50 kg per acre for direct sowing. The yield is 1000kg/acre and it fetches higher price because the local people like red rice variety more than other fine rice varieties. The farmers also store the seeds of this variety from the previous harvest to be sowed in the next season. This variety of rice is classified as a landrace, thus they have a distinct historical origin and identity, are diverse from other varieties because they are locally adapted and are associated with a particular set of farmers' practices of seed selection and field management as well as farmers' knowledge base.

Green Manuring

Prior to rice cultivation sowing of daincha (*Sesbania aculeata*) or Manila agathi (*Sesbania rostrata*) seeds @ 40 kg/ha by broadcasting as green manure and in situ incorporation at 50% flowering.

Green manure incorporation

Field Preparation:

Puddle the land thrice with country plough or power tiller after 15 days of incorporation of green/green leaf manure.

Puddling

Level the field for proper water and weed management.

Spacing: n 25 cm x 25 cm

Nutrient Management

Basal application of Rock phosphate @ 250 kg/ha, Gypsum @ 500 kg /ha, Neem cake @ 250 kg/ha, Azospirillum @ 2 kg/ha and Phosphobacteria @ 2 kg/ha .Top dressing with vermicompost @ 1 ton / ha at tillering, panicle initiation and heading stage .Foliar spray of Panchagavya @ 3 % at tillering and panicle initiation stage

Weed Management

Flood the field for 2-3 day after transplanting and a 5 cm water depth should be maintained throughout the growing season if weeds are problem in that area.

Calotropis gigantea as green leaf manure checks the growth of the weed Marsilea quadrifolia.

Cultivating Sesbania aculeata or S. rostrata as an intercrop between two paddy crop rows for biological N fixation and weed smothering.

Use of cono weeder thrice at 7-10 days interval from 15 days after planting on either direction of the rows.

Release of ducklings (200 Nos./ha) from 20 days after planting up to two months to reduce the manual labour needed for weeding, also feed on insects and their egg masses.

Insecticide and Pesticide

Borer Pests - Rice stem borer

- Apply neem cake 250 kg/ha as basal.
- Attract and kill the adult moths using light traps.
- Use pheromone traps @ 20/ha.
- Innundative release of Trichogramma japonicum five times @ 1,00,000 per ha.
- Apply Bacillus thuringiensis var kurstaki @ 1.0 kg/ha or
- Foliar spray of azadirachtin 10,000 ppm @ 500 ml / ha or NSKE @ 5%
- Spread leaves and stems of Datura in the field as repellents.

Sucking pests - Green leafhopper, Brown plant hopper

- Avoid close planting
- Basal application of neem cake @ 250 kg / ha
- Drain the water from the field to reduce the initial infestation
- Foliar spray of neem oil @ 3% or NSKE @ 5% of azadirachtin 1%
- Foliar spray of NSKE @ 5%

- Foliar spray of fungal based formulations like *Metarrhizium anisopliae* and *Beauveria bassiana* effective @ 2 g/litre of water

Disease Management

- Blast, sheath blight, brown spot
- Dry seed treatment with *Bacillus subtilis* talc formulation @ 10g/kg of seed.
- Spray *Bacillus subtilis* talc formulation @ 0.5% at 45, 55 and 65 DAT.
- Boil one kilogram of wild tulsi leaves in two litres of water. Strain and spray the solution twice at 15 days interval (@ 2 ml per litre of water)
- Bacterial Leaf Blight
- Use disease free seeds
- Spray neem oil @ 3% / NSKE @ 5%.
- Spray fresh cow dung extract 20% twice at 15 days intervals starting from initial appearance.

J) Uniqueness:

The Ramanadu Chithiraikar Rice stands out for several unique features that make it distinct from other rice varieties. These features not only highlight its agricultural significance but also its value in local cuisine and culture. Here's a look at what makes this rice variety unique:

1. Distinctive Appearance:

Bold and Round Grains: The grains of Ramanadu Chithiraikar Rice are bold and round, giving it a unique appearance compared to other rice varieties. The shape and size contribute to its distinctiveness.

Color Contrast: The rice has a unique outer skin that is slightly darker than other varieties, with a blackish hue, while the inner grain is red in color. This color combination is visually striking and a key characteristic of the variety.

2. Flavor and Nutritional Value:

Kanji (Rice Porridge): One of the most notable qualities of Ramanadu Chithiraikar Rice is its use in making kanji (rice porridge), which is favored for its taste. The rice is known to have a rich, hearty flavor that makes it a perfect ingredient for kanji, offering long-lasting satiety and nourishment.

Highly Nutritious: Unlike many modern rice varieties, the Ramanadu Chithiraikar Rice is recognized for its high nutritional value. It is often considered healthier due to its natural cultivation practices, with no excessive use of chemical fertilizers or pesticides. The rice's high nutritional content makes it suitable for traditional recipes such as dosa and idli, both of which benefit from its unique texture and flavor.

3. Cultural and Culinary Significance:

Traditional Use in South Indian Cuisine: The rice is especially popular for making dosa and idli, both staple foods in South India. The rice's texture and nutritional profile make it ideal for these dishes, which are central to the culinary culture of the region. Its ability to provide longer satiety has also made it a preferred choice for people seeking to consume nutritious, energy-dense meals.

Cultural Heritage: Being a landrace variety, Ramanadu Chithiraikar Rice is deeply intertwined with the culture and traditions of the Ramanadu region. The rice has been grown for generations and remains an integral part of the local agricultural heritage and identity.

4. Pest and Disease Resistance:

Unlike many commercial rice varieties, the Ramanadu Chithiraikar Rice is relatively resistant to pests and diseases, particularly under typical growing conditions in the region. This natural resistance makes it an environmentally-friendly and low-maintenance crop. However, it may be affected by leaf folder pests during times of water scarcity or stress, but it remains generally robust compared to many modern varieties.

5. Adaptability to Local Conditions:

Locally Adapted Landrace: This rice variety has adapted over centuries to the local climate and soil conditions of the Chithiraikar district. It thrives in the region's hot, dry conditions, with soil rich in nutrients such as sulfur, which enhances the rice's unique flavor and color.

Low Input Requirement: The rice is grown using traditional, sustainable farming methods, relying on direct sowing and minimal chemical use, which makes it more environmentally sustainable. It has adapted well to local farming systems, making it resilient even in periods of poor rainfall or drought.

6. High Yield and Straw Production:

Good Yield: The Ramanadu Chithiraikar Rice offers a relatively good yield of 1,500-1,800 kg per acre in normal monsoon conditions. Even in years with poor monsoon, the yield remains decent, typically ranging from 600-900 kg per acre. This makes it a dependable crop for local farmers.

Straw Production: The rice is also a high straw yielder, producing around 2 tonnes per acre. This straw can be used as fodder for livestock, making the rice plant useful beyond just its grains.

7. Sustainability and Seed Saving:

Seed Saving Tradition: One of the unique aspects of Ramanadu Chithiraikar Rice is its seed saving practice. Farmers typically store seeds from the previous harvest to plant in the next season. This ensures the continuation of the rice variety over generations, preserving its genetic integrity and ensuring that future crops will be just as resilient and productive as past ones.

Environmental Sustainability: The rice variety's ability to grow with minimal chemical intervention, its adaptability to local conditions, and its low water requirements make it an environmentally sustainable choice, promoting biodiversity and soil health.

8. Economic Value:

The price of Ramanadu Chithiraikar Rice is determined by market demand, with bags ranging from Rs. 300 to Rs. 450. Its uniqueness, combined with its cultural and nutritional value, makes it a premium product in the local markets.

The Ramanadu Chithiraikar Rice is unique for its distinctive appearance, nutritional benefits, resilience to pests, and strong cultural ties to the Ramanadu region. It thrives in local soil and climatic conditions, making it a valuable, sustainable crop for farmers. The rice's rich history, flavorful kanji, and use in traditional South Indian foods contribute to its uniqueness, and its continued cultivation preserves both agricultural heritage and local food traditions.

The Chithiraikar Rice, particularly the Sivappu Chithiraikar, holds a special place among the landraces of rice grown in the region.

1. Dominance of Chithiraikar Landraces:

Chithiraikar rice varieties, including Sivappu Chithiraikar, are major landraces in the region, covering more than 22% of the total area under rice cultivation in sample forms. These landraces are essential for preserving local agricultural traditions and provide an important base for the region's rice production.

2. Definition and Importance of Landraces:

Landraces are dynamic populations of cultivated plants that have a historical origin and are distinct in their characteristics. These varieties are genetically diverse and locally adapted, thriving in the specific soil and climatic conditions of the region.

A defining feature of landraces is their association with traditional farming practices, such as seed selection, field management, and a wealth of farmers' knowledge. This means that the rice variety has been passed down through generations, maintaining its unique qualities over time.

3. Rice Kanji (Porridge):

One of the key culinary benefits of the Chithiraikar Rice is its ability to be made into kanji (rice porridge), which is highly valued for its taste and nutritional benefits.

The kanji made from this variety is hearty, providing long-lasting satiety and effectively preventing hunger for several hours. This makes it a preferred choice for families in the region, especially as a staple food during long periods of labor or fasting.

4. Nutritional Value:

Sivappu Chithiraikar rice, compared to polished rice and other rice varieties, offers higher nutritional value. It retains its nutrient-rich bran and outer layers, which are typically stripped away in polished rice.

This unpolished nature preserves essential nutrients, such as fiber, vitamins, and minerals, making the rice more nutritious and beneficial for health.

5. Adaptation to Local Conditions:

Sivappu Chithiraikar rice, like other landraces, is locally adapted, thriving in the specific environmental conditions of the region. Its cultivation practices are deeply tied to traditional farming knowledge, which has been passed down for generations.

The Chithiraikar Rice, especially the Sivappu Chithiraikar, is a vital part of the agricultural heritage in the region. Its status as a landrace reflects its deep connection to local farming traditions and its ability to adapt to the local environment. With its rich nutritional profile, long-lasting satiety in kanji, and high value compared to other rice varieties, it remains a highly valued crop in the region's culture and cuisine.

K) Inspection Body:

In the future, the inspection body will be formed which may be constituted by the below-mentioned persons to keep a check on the quality of the products.

- Chief Executive Officer, TANSAMB, Chennai
- One member from the GI Applicant

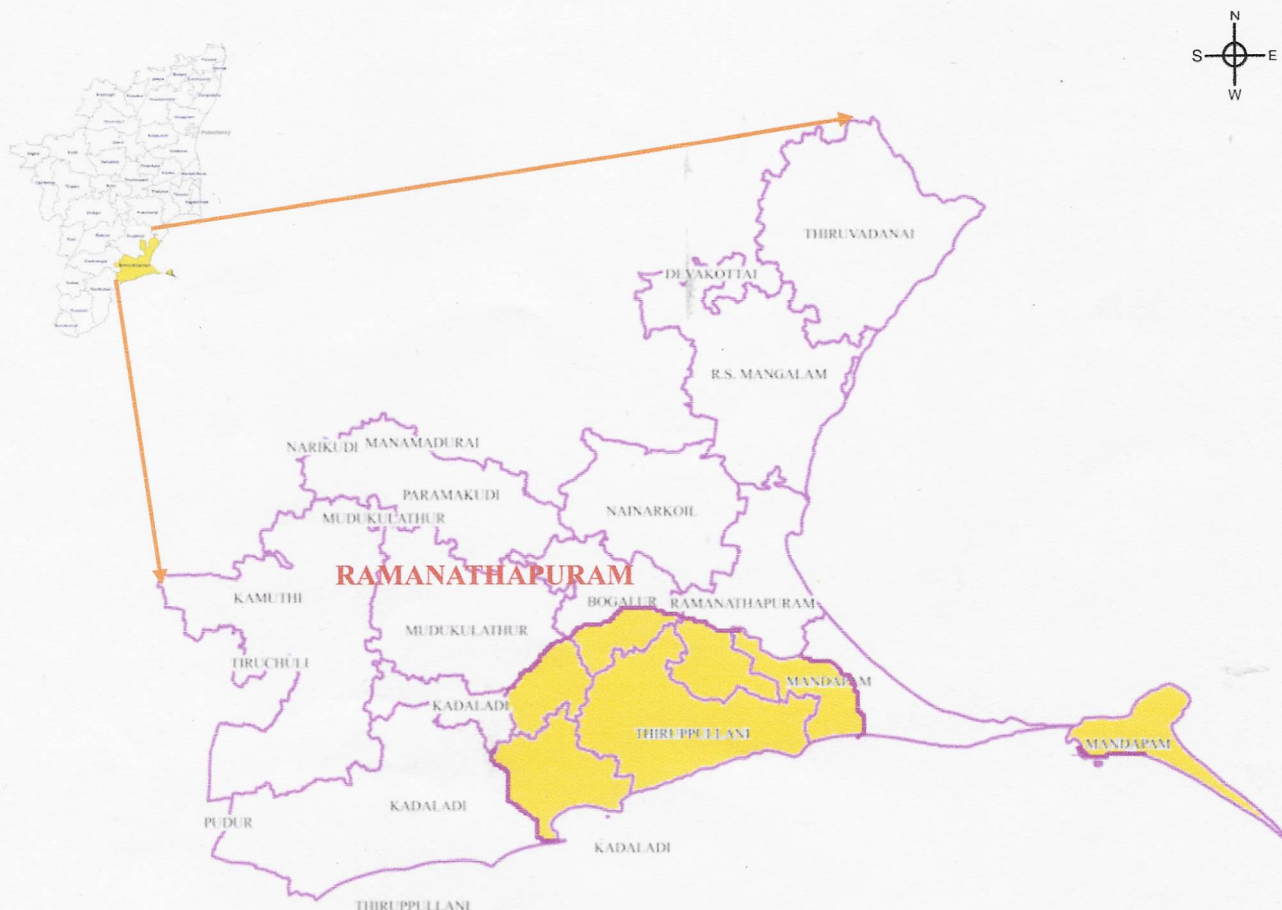
- Deputy Director (Agribusiness), Ramanathapuram
- District Development Manager, NABARD, Ramanathapuram
- Coastal Saline Research Center, Ramanathapuram
- NABARD Madurai Agribusiness Incubation Forum, Madurai
- One member from the Agriculture Department, Ramanathapuram
- One member from Sulashana Panneer Selvam, IPR for Agriculture and Rural Development Centre (NGO)

This inspection body formed by the applicant will be acting independently to ensure the quality check upon the goods and the applicant also undertakes that the inspection body will keep the check on the quality, manufacturing, and mechanism of the goods. The abovementioned persons may constitute the inspection body.

L) Others:


RAMANATHAPURAM CHITHIRAIKAR RICE CULTIVATION AREA

INDIA>TAMILNADU> RAMANATHAPURAM



Latitude: 9°12' 51" N to 9°20' 52" N

Longitude: 78° 41' 43" E to 78° 55' 32"E

 -Ramanathapuram Chithirai Kar Rice Cultivation Area

3. vignesh

H. Vijay
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General Information

What is a Geographical Indication?

- It is an indication,
- It is used to identify agricultural, natural, or manufactured goods originating in the said area,
- It originates from a definite territory in India,
- It should have a special quality or characteristics unique to the geographical indication.

Examples of possible Geographical Indications in India:

Some of the examples of Geographical Indications in India include Basmati Rice, Darjeeling Tea, Kancheepuram silk saree, Alphonso Mango, Nagpur Orange, Kolhapuri Chappal, Bikaneri Bhujia etc.

What are the benefits of registration of Geographical Indications?

- It confers legal protection to Geographical Indications in India,
- It prevents unauthorized use of a registered Geographical Indication by others.
- It boosts exports of Indian Geographical indications by providing legal Protection.
- It promotes economic Prosperity of Producers.
- It enables seeking legal protection in other WTO member countries.

Who can apply for the registration of a Geographical Indication?

Any association of persons, producers, organization or authority established by or under the law can apply.

The applicant must represent the interest of the producers.

The application should be in writing in the prescribed form.

The application should be addressed to the Registrar of Geographical Indications along with prescribed fee.

Who is the Registered Proprietor of a Geographical Indication?

Any association of persons, producers, organization or authority established by or under the law can be a registered proprietor. Their name should be entered in the Register of Geographical Indications as registered proprietor for the Geographical Indication applied for.

Who is an authorized user?

A producer of goods can apply for registration as an authorized user, with respect to a registered Geographical Indication. He should apply in writing in the prescribed form along with prescribed fee.

Who is a producer in relation to a Geographical Indication?

A producer is a person dealing with three categories of goods

- Agricultural Goods including the production, processing, trading or dealing.
- Natural Goods including exploiting, trading or dealing.
- Handicrafts or industrial goods including making, manufacturing, trading or dealing.

Is registration of a Geographical Indication compulsory?

While registration of Geographical indication is not compulsory, it offers better legal protection for action for infringement.

What are the advantages of registering?

- Registration affords better legal protection to facilitate an action for infringement.

- The registered proprietor and authorized users can initiate infringement actions.
- The authorized users can exercise right to use the Geographical indication.

Who can use the registered Geographical Indication?

Only an authorized user has the exclusive rights to use the Geographical indication in relation to goods in respect of which it is registered.

How long is the registration of Geographical Indication valid? Can it be renewed?

The registration of a Geographical Indication is for a period of ten years.

Yes, renewal is possible for further periods of 10 years each.

If a registered Geographical Indication is not renewed, it is liable to be removed from the register.

When a Registered Geographical Indication is said to be infringed?

- When unauthorized use indicates or suggests that such goods originate in a geographical area other than the true place of origin of such goods in a manner which misleads the public as to their geographical origins.
- When use of Geographical Indication results in unfair competition including passing off in respect of registered Geographical indication.
- When the use of another Geographical Indication results in a false representation to the public that goods originate in a territory in respect of which a Geographical Indication relates.

Who can initiate an infringement action?

The registered proprietor or authorized users of a registered Geographical indication can initiate an infringement action.

Can a registered Geographical Indication be assigned, transmitted etc?

No, A Geographical Indication is a public property belonging to the producers of the concerned goods. It shall not be the subject matter of assignment, transmission, licensing, pledge, mortgage or such other agreement. However, when an authorized user dies, his right devolves on his successor in title.

Can a registered Geographical Indication or authorized user be removed from the register?

Yes, The Appellate Board or the Registrar of Geographical Indication has the power to remove the Geographical Indication or authorized user from the register. The aggrieved person can file an appeal within three months from the date of communication of the order.

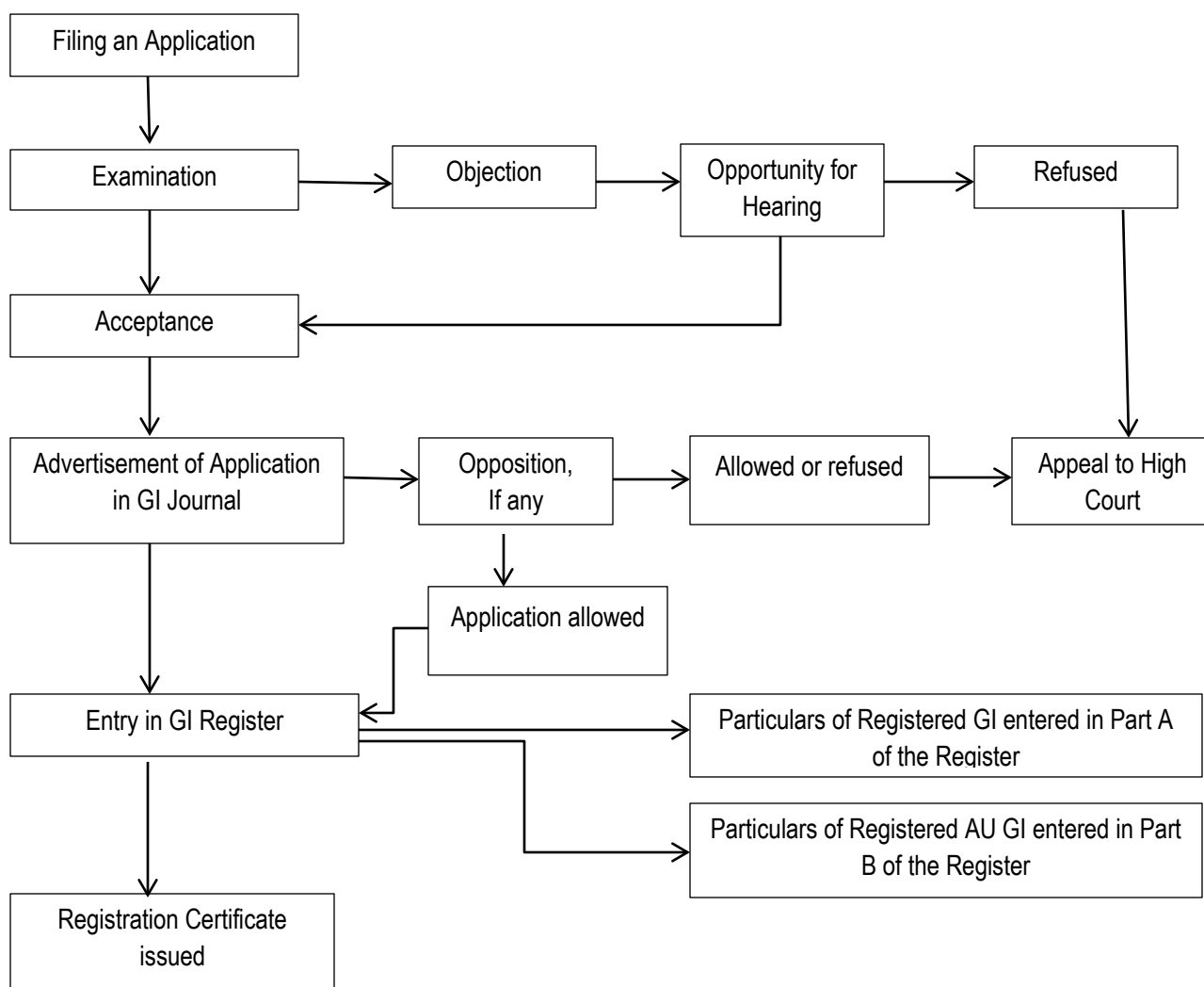
How a Geographical Indication differs from a trade mark?

A trade mark is a sign which is used in the course of trade and it distinguishes good or services of one enterprise from those of other enterprises. Whereas a Geographical Indication is used to identify goods having special Characteristics originating from a definite geographical territory.

THE REGISTRATION PROCESS

In December 1999, Parliament passed the Geographical Indications of Goods (Registration and Protection) Act 1999. This Act seeks to provide for the registration and protection of Geographical Indications relating to goods in India. This Act is administered by the Controller General of Patents, Designs and Trade Marks, who is the Registrar of Geographical Indications. The Geographical Indications Registry is located at Chennai.

The Registrar of Geographical Indication is divided into two parts. Part 'A' consists of particulars relating to registered Geographical indications and Part 'B' consists of particulars of the registered authorized users. The registration process is similar to both for registration of geographical indication and an authorized user which is illustrated below:





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